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CONTENTS OF VOLUME XLV.

NUMBER 1.

PAGE

1. **Acidosis and Œdema in its Relation to Glaucoma.** By HENRY SMITH, V.H.S., Lt.-Colonel I.M.S., Civil Surgeon, Amritsar, India 1

2. **Histological Findings after Iridotasis.** By Dr. F. H. VERHOEFF, Boston. (With one illustration on Text-Plate I.) 5

3. **Lumbar Puncture and Examination of the Spinal Fluid in Affections of the Eye.** By JAMES B. AYER, M.D., Boston, Mass . . 9

4. **Massive Granuloma of the Sclera (Brawny Scleritis), with the Report of an Unusual Case.** By GEORGE S. DERBY, M.D., Boston, Mass. (With three illustrations on Text-Plate II.) . . 20

5. **Torticollis Relieved by Tenotomy of the Inferior Oblique.** By Dr. ALEXANDER DUANE, New York. (With seven illustrations) . 33

6. Dr. JAMES TAYLOR **On the Work of Hughlings Jackson** . . 41

7. **Local Anæsthesia in Exenteration and Enucleation of the Eyeball with Novocain Solution.** By Dr. H. ILLIG, Munich. Translated from the *Arch. f. Augen.*, Vol. LXXX., p. 23, 1915. . . . 46

8. **Examination of the Visual Field in Glaucoma and its Value for Differential Diagnosis.** By Prof. W. LÖHLEIN, Greifswald. Translated from the *Arch. f. Augenh'lkde*, Vol. LXXVI., Nos. 3 and 4, 1914. (With five illustrations in text.) 51

9. **Report of the Transactions of the Section on Ophthalmology of the New York Academy of Medicine.** By GEORGE H. BELL, M.D., Secretary 56

10. **Quarterly Review of the Progress of Ophthalmology in the First and Second Quarters, 1915.** By H. KOELLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMELL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER, Strassburg; K. Wessely, Würzburg; and M. WOLFRUM, Leipsic; with the Assistance of Drs. ALLING, New Haven; CALDERARO, Rome; CAUSÉ, Mayence; CURRAN, Kansas City; DANIS, Brussels;

305301

PAGE

GILBERT, Munich; GROENHOLM, Helsingfors; v. POPPEN, Petrograd; TREUTLER, Dresden; and VISSER, Amsterdam. Edited by MATTHIAS LANCKTON FOSTER, M.D., F.A.C.S., New Rochelle, N. Y. 65

First Quarter, 1915. (*Continued.*)
XVI.—Choroid, 65; XVII.—Sympathetic ophthalmia, 66; XVIII.—Glaucoma, 67; XIX.—Retina, 70; XX.—Optic nerve and visual tract, 74; XXI.—Accidents, injuries, foreign bodies, parasites, 75

Second Quarter, 1915.
I.—General ophthalmic literature, see **Book Reviews**; II.—Relations of ophthalmic to general diseases, including poisons, 79; III.—General and experimental pathology and treatment, 81; IV.—Methods of research, remedies, instruments, and general operative technique, 82; V.—Anatomy, embryology, malformations, 83; VI.—The sense of sight, 85; VII.—Accommodation and refraction, 86; VIII.—The motor apparatus of the eye, 86; IX.—Lids, 87; X.—Lacrimal organs, 87; XI.—Orbits, including exophthalmos, accessory sinuses, 88; XII.—Conjunctiva, 90; XIII.—Cornea and sclera, 91; XIV.—Iris and pupils, 93; XV.—Lens, 93; XVI.—Vitreous and choroid, 95; XVII.—Sympathetic ophthalmia 95; XVIII.—Glaucoma, 95; XIX.—Retina, optic nerve, and the visual tract, 96; XX.—Accidents, injuries, foreign bodies, parasites, 99.

11. **Book Reviews** 103

I.—**Surgery of the Eye.** By Dr. JOHN M. WHEELER, New York, in Johnson's Operative Therapeutics. In Volume III., Chapter 2.

II.—**Squint: Its Causes, Pathology, and Treatment.** By CLAUD WORTH, F.R.C.S.

III.—**Glaucoma: A Symposium.** Edited by Drs. WILLIS O. NANCE and W. H. PECK, Chicago.

IV.—**Ophthalmoscopic Diagnosis for General Practitioners and Students.** By Dr. GEO. W. JEAN, New York.

V.—**Lehrbuch der Augenheilkunde. (Text-Book of Ophthalmology.)** Edited by Prof. T. AXENFELD.

VI.—**The Ophthalmic Year Book.** Volume XI. for 1914. Edited by Dr. E. JACKSON, Denver.

12. **Notes** 107

13. **Obituary** 108

NUMBER 2.

PAGE

1. **Purulent Conjunctivitis in Infants under Two Months of Age; Incidence, Causes, and Effect on Vision.** By ANNA W. WILLIAMS, M.D., and CAROLYN ROSENBERG, M.D., New York . . . 109

2. **Digital Compression of the Lacrimal Sac in Dacryocystitis, Especially of the Newborn.** By JUAN SANTOS-FERNANDEZ, M.D., Havana, Cuba 117

3. **Anomalies of the Accommodation, Clinically Considered.** By ALEXANDER DUANE, M.D., New York 124

4. **Tenotomy of the Inferior Oblique Muscle.** By WILLIAM CAMPBELL POSEY, M.D., Philadelphia, Pa. (With six photographs on Text-Plate III.) 137

5. **Rosacea Keratitis and Certain Other Forms of Marginal Keratitis, Neuropathic in Origin. Treatment by Pericorneal Neurotomy.** By F. H. VERHOEFF, A.M., M.D., Boston, Mass. . . . 148

6. **Bacteriological and Clinical Studies of an Epidemic of Koch-Weeks Bacillus Conjunctivitis Associated with Cell Inclusion Conjunctivitis.** By HIDEYO NOGUCHI, M.D., and MARTIN COHEN, M.D., New York. (With fifty-five figures on Text-Plates IV., V., VI.) 155

7. **Clinical Pathology of Ocular Muscle Paralysis; A Critique of the More Recent Literature on Ocular Movements, with Special Reference to the Study of the Control of the Ocular Muscles.** By WILL WALTER, M.D., Chicago 172

8. **Report of the Transactions of the Section on Ophthalmology of the New York Academy of Medicine.** By GEORGE H. BELL, M.D., Secretary 195

9. **Report of the Transactions of the Section on Ophthalmology of the Royal Society of Medicine.** By C. DEVEREUX MARSHALL, F.R.C.S., London 201

NUMBER 3.

1. **On the Declinations of the Vertical Meridians of the Retina.** By GEORGE T. STEVENS, M.D., Ph.D., New York. (With three figures in the text.) (First paper.) 205

2. **Frozen Carbon-Dioxide in the Treatment of Trachoma, Vernal Catarrh, and Pterygium.** By DR. A. E. PRINCE, Springfield, Ill. (With one figure in the text.) 219

PAGE

3. **The Localization of Streptococci in the Eye. A Study of Experimental Iridocyclitis in Rabbits.** By E. V. L. BROWN, M.D., ERNEST E. IRONS, M.D., and W. H. NADLER, M.D., Chicago. (With eight photographs on Text-Plates VII., VIII., IX., X.) . 229

4. **Anilin Injuries of the Eye. Report of a Case with Deep Ulceration of the Lower Lid.** By R. J. CURDY, M.D., Kansas City, Missouri. 243

5. **Optic Neuritis after Influenza, with Changes in the Spinal Fluid.** By Dr. ARNOLD KNAPP, New York 247

6. **Two Cases of Metastatic Ophthalmia Consecutive to Pneumonia.** By MARTIN COHEN, M.D., New York. 250

7. **On the Correct Use of the Giant Magnet in Operations on the Eye.** By Prof. O. HAAB, Zürich. Translated from the *Arch. f. Augenheilk.*, Vol. LXXVII., No. 4, 1914 256

8. **On the Examination of the Color Sense with Pigment Colors.** By Dr. HELMBOLD, Danzig. Translated from the *Archiv f. Augenheilkunde*, Vol. LXXV., 1913. (With appended Plate XXIII., from the German Edition.). 270

9. **Description of an Exophthalmometer.** By Prof. W. LOHMANN, Munich. Translated from the *Archiv f. Augenheilkunde*, Vol. LXXV., 1913. (With two illustrations in the text.) . . . 275

10. **Report of the Proceedings of the Section on Ophthalmology of the New York Academy of Medicine.** By GEORGE H. BELL, M.D., Secretary, and LEWIS W. CRIGLER, M.D., Secretary . . . 278

11. **Report of the Transactions of the Section on Ophthalmology of the Royal Society of Medicine.** By C. DEVEREUX MARSHALL, F.R.C.S., London 289

12. **Quarterly Review of the Progress of Ophthalmology in the Third Quarter, 1915.** By H. KOELLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMELL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER, Strassburg; K. Wessely, Würzburg; and M. WOLFRUM, Leipsic; with the Assistance of Drs. ALLING, New Haven; CALDERARO, Rome; CAUSÉ, Mayence; CURRAN, Kansas City; DANIS, Brussels; GILBERT, Munich; GROENHOLM, Helsingfors· v. POPPEN, Petrograd; TREUTLER, Dresden; and VISSER, Amsterdam. Edited by MATTHIAS LANCKTON FOSTER, M.D., F.A.C.S., New Rochelle, N. Y. 292

PAGE

I.—General ophthalmic literature, 292; II.—Relations of ophthalmic to general diseases, including poisons, 294; III.—General and experimental pathology and treatment, 295; IV—Methods of research, remedies, instruments and general operative technic, 296; V.—Anatomy, embryology, malformations, 297; VI.—Nutrition and tension, 300; VII.—The sense of sight, 302. (*To be continued*)

13. **Correspondence.** 304

NUMBER 4.

1. **A Discussion of Some Newer Principles in Dealing with Uncomplicated Cataract.** By DERRICK T. VAIL, M.D., F.A.C.S., Cincinnati, Ohio. 307

2. **Studies on the Action of Toxins and Protein Degeneration Products on the Eye.** By ALAN C. WOODS, M.D., Philadelphia, and JAMES L. STODDARD, M.D., Boston 321

3. **Three Years' Experience in Sclerocorneal Trephining in Glaucoma.** By W. H. WILMER, M.D., Washington, D.C. 333

4. **Report of Cases of Quinine Amblyopia, with Remarks.** By JOHN E. WEEKS, M.D., New York. (With six figures in the text) . 342

5. **A Case of Syphilitic Retinochoroiditis Juxtapapillaris, with Microscopic Examination.** By F. H. VERHOEFF, M.D., Boston. (With one illustration on Text-Plate XI.) 352

6. **The Operative Treatment of Partial Staphyloma of the Cornea and of Fistula of the Cornea with a Conjunctival Flap, Conjunctivo-Keratoplasty (Kuhnt).** By ARNOLD KNAPP, M.D., New York . 359

7. **Report of the Proceedings of the Section on Ophthalmology of the New York Academy of Medicine.** By LEWIS W. CRIGLER, M.D., Secretary 364

8. **Report of the Transactions of the Section on Ophthalmology of the Royal Society of Medicine.** By C. DEVEREUX MARSHALL, F.R.C.S., London 379

9. **Quarterly Review of the Progress of Ophthalmology in the Third Quarter, 1915 (*Continued*).** By H. KOELLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMELL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER,

PAGE

Strassburg; K. Wessely, Würzburg; and M. WOLFRUM, Leipsic; with the Assistance of Drs. ALLING, New Haven; CALDERARO, Rome: CAUSÉ, Mayence; CURRAN, Kansas City; DANIS, Brussels; GILBERT, Munch; GROENHOLM, Helsingfors; v. POPPEN, Petrograd; TREUTLER, Dresden; and VISSER, Amsterdam. Edited by MATTHIAS LANCKTON FOSTER, M.D., F.A.C.S., New Rochelle, N. Y. 382

VIII.—Accommodation and refraction, 382; IX.—The motor apparatus of the eyes, 382; X.—Lids, 383; XI.—Lacrimal organs, 384; XII.—Orbits, exophthalmos, accessory sinuses, 385; XIII.—Conjunctiva, 387; XIV.—Cornea and sclera, 389; XV.—Iris and pupil, 392; XVI.—Lens, 394; XVII.—Vitreous, choroid, and sympathetic ophthalmia, 396; XVIII.—Glaucoma, 396; XIX.—Retina, optic nerve, and visual tract, 398; XX.—Accidents, injuries, foreign bodies, parasites, 401.

NUMBER 5.

1. **Studies of Optic-Nerve Atrophy in Association with Chiasmal Lesions.** By CLIFFORD B. WALKER, M.D., and HARVEY CUSHING, M.D. (With forty-seven cuts in the text and on Text-Plates XII–XXIII.) 407

2. **On the Declinations of the Vertical Meridians of the Retina.** By GEORGE T. STEVENS, M.D., Ph.D., New York. (With six figures in the text.) (Second paper) 438

3. **Studies on the Action of Toxins and Protein Degeneration Products on the Eye. II. The Action, Nature, and Source of the "Uveal Poison" of Ferment-Producing Bacteria.** By Dr. ALAN C. WOODS, Philadelphia 451

4. **Report of a Case of Melanosarcoma of the Orbit, Treated with Radium.** By EDWARD B. HECKEL, M.D., Pittsburgh, Pa. (With three photographs on Text-Plate XXIV.) 465

5. **Retrobulbar Neuritis with Central Scotoma from Toxic Action of Thyroidin.** By Dr. MYLES STANDISH, Boston 469

6. **Report of the Removal of a Tumor at the Apex of the Orbit, with Preservation of the Eyeball, in a Case of Plexiform Neuroma of the Eyelid. Microscopical Examination.** By Dr. ARNOLD KNAPP, New York. (With two illustrations on Text-Plate XXV.) 475

7. **Improved Capsule Forceps for Intracapsular Cataract Extractions.** By Dr. F. H. VERHOEFF. (With one figure in the text) . 479

PAGE

8. **Report of the Proceedings of the Section on Ophthalmology of the New York Academy of Medicine.** By LEWIS W. CRIGLER, M.D., Secretary 483

9. **Report of the Transactions of the Ophthalmological Society of the United Kingdom. Annual Congress.** By C. DEVEREUX MARSHALL, F.R.C.S., London 487

10. **Quarterly Review of the Progress of Ophthalmology in the Fourth Quarter, 1915.** By H. KOELLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMELL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER, Strassburg; K. WESSELY, Würzburg; and M. WOLFRUM, Leipsic; with the Assistance of Drs. ALLING, New Haven; CALDERARO, Rome; CAUSÉ, Mayence; CURRAN, Kansas City; DANIS, Brussels; GILBERT, Munich; GROENHOLM, Helsingfors; v. POPPEN, Petrograd; TREUTLER, Dresden; and VISSER, Amsterdam. Edited by MATTHIAS LANCKTON FOSTER, M.D., F.A.C.S., New Rochelle, N. Y. 495

I.—General ophthalmic literature, 495; II.—Relations of ophthalmic to general diseases, including poisons, 497; III.—General and experimental pathology and treatment, 500; IV.—Operative technic, 503; V.—Anatomy, embryology, malformations, 504; VI.—Nutrition and intraocular tension, 506; VII.—The sense of sight, 507; VIII.—Accommodation and refraction, 509; IX.—The motor apparatus of the eye, 510; X.—Lids, 512; XI.—Lacrimal organs, 512; XII.—Orbits, exophthalmos, accessory sinuses, 513; XIII.—Conjunctiva, 514; XIV.—Cornea and sclera, 517.

NUMBER 6

1. **On the Declinations of the Vertical Meridians of the Retina.** By GEORGE T. STEVENS, M.D., Ph.D., New York. (With nine line cuts in the text.) (Third paper) 521

2. **Progressive Macular Degeneration in Three Members of a Family.** By MARCUS FEINGOLD, M.D., New Orleans, La. (With five illustrations in color on Text-Plates XXVI. and XXVII.) 533

3. **The Medical Side of Glaucoma.** By Dr. ARNOLD KNAPP, New York. (With two figures in the text) 544

PAGE

4. **Tuberculosis of the Retinal Vessels.** By EDWARD JACKSON, M.D., Denver, Colo. (With illustration on Text-Plate XXVIII.) 552

5. **Ocular Anaphylaxis: I. The Reaction to Perfusion with Specific Antigen.** By ALAN C. WOODS, M.D., Philadelphia. (With three line illustrations in text.) 557

6. **A Study as to Weight and Percentage of Solids of Cataractous Lenses.** By Dr. C. A. CLAPP, Baltimore, Md. 574

7. **Can the Development of Myopia be Arrested and its Degenerative Changes be Prevented?** By Dr. SIDLER-HUGUENIN, Zurich. Translated from the **Archiv f. Augenhlk.**, Vol. LXXIX., 1915 577

8. **Report of the Proceedings of the Section on Ophthalmology of the New York Academy of Medicine.** By LEWIS W. CRIGLER, M.D., Secretary 589

9. **Report of the Transactions of the Section on Ophthalmology of the Royal Society of Medicine.** By Mr. C. DEVEREUX MARSHALL, F.R.C.S., London 596

10. **Quarterly Review of the Progress of Ophthalmology in the Fourth Quarter, 1915** (*Continued*). By H. KOELLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMELL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER, Strassburg; K. Wessely, Würzburg; and M. WOLFRUM, Leipsic; with the Assistance of Drs. ALLING, New Haven; CALDERARO, Rome; CAUSÉ; Mayence; CURRAN, Kansas City; DANIS, Brussels; GILBERT, Munich; GROENHOLM, Helsingfors; v. POPPEN, Petrograd; TREUTLER, Dresden; and VISSER, Amsterdam. Edited by MATTHIAS LANCKTON FOSTER, M.D., F.A.C.S., New Rochelle, N. Y. 599

XV.—Iris and pupils, 599; XVI.—Lens, 600; XVII.—Choroid, 602; XVIII.—Glaucoma, 603; XIX.—Retina, optic nerve, and visual tract, 604; XX.—Accidents, injuries, foreign bodies, parasites, 606

11. **Book Reviews** 609

VII.—**Principles and Practice of Perimetry.** By Dr. LUTHER C. PETER, Philadelphia.

VIII.—**Methods of Refraction.** By Dr. JAMES THORINGTON.

12. **Obituary:** Dr. WILBUR BOILEAU MARPLE 611

13. **Index of Authors and Subjects,** Vol. XLV. 613

EDITORIAL NOTICE.

The Archives of Ophthalmology is a bi-monthly journal, published in annual volumes of about six hundred pages each, extensively illustrated with cuts in the text, half-tone text plates, and lithographic plates, many in colors.

About three quarters of the space is devoted to original papers, and the remaining quarter to a systematic report on the progress of ophthalmology, and to reports of societies, book reviews, and miscellaneous notes, all of it original.

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CONTENTS OF VOLUME XLV., NUMBER 1.

PAGE

1. **Acidosis and Œdema in its Relation to Glaucoma.** By HENRY SMITH, V.H.S., Lt.-Colonel I.M.S., Civil Surgeon, Amritsar, India 1

2. **Histological Findings after Iridotasis.** By Dr. F. H. VERHOEFF, Boston. (With one illustration on Text-Plate I.) 5

3. **Lumbar Puncture and Examination of the Spinal Fluid in Affections of the Eye.** By JAMES B. AYER, M.D., Boston, Mass . . 9

4. **Massive Granuloma of the Sclera (Brawny Scleritis), with the Report of an Unusual Case.** By GEORGE S. DERBY, M.D., Boston, Mass. (With three illustrations on Text-Plate II.) . . 20

5. **Torticollis Relieved by Tenotomy of the Inferior Oblique.** By Dr. ALEXANDER DUANE, New York. (With seven illustrations) . 33

6. Dr. JAMES TAYLOR **On the Work of Hughlings Jackson** . . 41

7. **Local Anæsthesia in Exenteration and Enucleation of the Eyeball with Novocain Solution.** By Dr. H. ILLIG, Munich. Translated from the *Arch. f. Augen.*, Vol. LXXX., p. 23, 1915. 46

8. **Examination of the Visual Field in Glaucoma and its Value for Differential Diagnosis.** By Prof. W. LÖHLEIN, Greifswald. Translated from the *Arch. f. Augenh'lkde*, Vol. LXXVI., Nos. 3 and 4, 1914. (With five illustrations in text.) 51

9. **Report of the Transactions of the Section on Ophthalmology of the New York Academy of Medicine.** By GEORGE H. BELL, M.D., Secretary 59

10. **Quarterly Review of the Progress of Ophthalmology in the First and Second Quarters, 1915.** By H. KOELLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMELL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER, Strassburg; K. Wessely, Würzburg; and M. WOLFRUM, Leipsic; with the Assistance of Drs. ALLING, New Haven; CALDERARO, Rome; CAUSÉ, Mayence; CURRAN, Kansas City; DANIS, Brussels; GILBERT, Munich; GROENHOLM, Helsingfors; V. POPPEN, Petrograd; TREUTLER, Dresden; and VISSER, Amsterdam. Edited by MATTHIAS LANCKTON FOSTER, M.D., F.A.C.S., New Rochelle, N. Y. 65

PAGE

First Quarter, 1915. (*Continued.*)

XVI.—Choroid, 65; XVII.—Sympathetic ophthalmia, 66; XVIII.—Glaucoma, 67; XIX.—Retina, 70; XX.—Optic nerve and visual tract, 74; XXI.—Accidents, injuries, foreign bodies, parasites, 75

Second Quarter, 1915.

I.—General ophthalmic literature, see **Book Reviews**; II.—Relations of ophthalmic to general diseases, including poisons, 79; III.—General and experimental pathology and treatment, 81; IV.—Methods of research, remedies, instruments, and general operative technique, 82; V.—Anatomy, embryology, malformations, 83; VI.—The sense of sight, 85; VII.—Accommodation and refraction, 86; VIII.—The motor apparatus of the eye, 86; IX.—Lids, 87; X.—Lacrimal organs, 87; XI.—Orbits, including exophthalmos, accessory sinuses, 88; XII.—Conjunctiva, 90; XIII.—Cornea and sclera, 91; XIV.—Iris and pupils, 93; XV.—Lens, 93; XVI.—Vitreous and choroid, 95; XVII.—Sympathetic ophthalmia 95; XVIII.—Glaucoma, 95; XIX.—Retina, optic nerve, and the visual tract, 96; XX.—Accidents, injuries, foreign bodies, parasites, 99.

11. **Book Reviews** 103

I.—**Surgery of the Eye.** By Dr. JOHN M. WHEELER, New York, in Johnson's Operative Therapeutics. In Volume III., Chapter 2.

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VI.—**The Ophthalmic Year Book.** Volume XI. for 1914. Edited by Dr. E. JACKSON, Denver.

12. **Notes** 107

13. **Obituary** 108

VOL. XLV. No. 1

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ACIDOSIS AND ŒDEMA IN ITS RELATION TO GLAUCOMA.

BY HENRY SMITH, V.H.S., LT.-COLONEL I.M.S., CIVIL SURGEON, AMRITSAR, INDIA.

EVERY one in the profession and very many outside it have heard of acidosis. It has been pressed in as the cause of many diseases. Two years ago I was presented with a copy of a book on œdema by Dr. Martin H. Fischer, Professor of Pathology, Oakland School of Medicine, California, along with the apparatus and detailed instructions how to determine the acidity of urine, and with a request to determine its acidity in all cases of glaucoma under my care Dr. Fischer's book I read with great interest and care. It includes a large amount of carefully done experimental work on dead tissues and on living animals. It also deals with the œdema of special organs and is, I have little doubt, the basis of much of the theories on acidosis. While it is a most interesting and suggestive book, it is not convincing from a clinical point of view. We all know how disappointing laboratory results often are when we proceed to apply them clinically.

The conclusions to be arrived at from reading this book are that many œdemas, including glaucoma as an œdema, are caused by acidosis.

How are we clinically to determine what is acidosis? The only means we have is to determine the normal acidity of the urine and what is to be considered pathological variations from that normality.

To determine acidity the solutions used are phenolphthalein solution as the indicator and decinormal sodium-hydrate solution as the neutralizer. The former solution, when added in a drop or two to the acid solution to be determined, turns permanently red when the sodium-hydrate solution is added to beyond the neutral point. It is a very delicate test and a very simple one to apply. A glass tube is used having 5*cc* marked on the bottom end, above which it is marked in centimeters and again in tenths of centimeters. The urine to be examined is added up to the 55*cc* mark, one or two drops of phenolphthalein solution are next added, and to this is added decinormal sodium-hydrate solution, shaking the tube, until its contents change color permanently; every *cmm* of the sodium-hydrate solution added being treated as one degree of acidity. Any one desirous can calculate out the acidity in terms of hydrochloric acid. I asked my friend what was regarded as normal acidity in America. He said thirty was the accepted physiological normal. I asked him how this normal was ascertained. He did not know. I was not satisfied with this normal. Major Black, I. M. S., Chemical Examiner to the Punjab Government, kindly prepared the phenolphthalein and decinormal sodium-hydrate solution for me. I thus made sure that the solutions were correct. I got from a cantonment station six hundred specimens of urine from British soldiers and six hundred specimens from Indian soldiers. These were the first specimen of urine passed in the morning. These troops were in perfect health, on full ordinary military duty, and roughly speaking between the ages of twenty and thirty. British troops are meat eaters, the Indian troops are for practical purposes vegetarians. Captain S. Gibson, R.A.M.C., and Dr. Mehta kindly assisted me in getting through this work with the requisite quickness. This work was done in the month of November when the temperature and climate conditions are somewhat the same as a dry month of June in England, so that the amount of perspiration and of urine passed would be about the same as in England in June. The state of concentration or dilution of urine will thus be understood. The average acidity in the case of Indian troops was slightly higher—about one degree—than that of British troops, so that I mix up the figures for the following statistical table.

1200 SPECIMENS OF URINE EXAMINED.

No. of Specimens.	*Percentages of Specimens.*	*Acidity cmm or Degrees.*
10	0.83	110.
50	4.16	100.
60	5.00	90.
100	8.35	80.
170	14.16	70.
150	12.50	60.
180	15.00	50.
180	15.00	40.
170	14.16	30.
100	8.33	20.
30	2.50	10.

From these figures, which I think are ample enough, it seems to me that an average determined thereon is worthless. There is such a wide range in health that we could not say of a given case within these limits that a particular condition is due to a relatively acid condition of the circulating medium, taking the urine as an indicator of that condition. I have examined the urine of many patients suffering from glaucoma, and the acidity would come well within the limits of health as indicated by the above figures, so that we could arrive at no conclusion as to the connection of acidosis with glaucoma.

Dr. Fischer's book, however, as the title implies, treats of œdema which may be caused by other conditions than acidosis, though a great deal of importance is attached to acidosis.

Dr. Fischer is, as far as I am aware, the first man tc advance the view that glaucoma is primarily an œdema, mechanical factors on which other theories of glaucoma seem to be based being secondary to this œdema. I think that the mechanical theories are exceedingly far from convincing as regards the causation of glaucoma, and I am disposed to regard Dr. Fischer's view as much more rational. The œdema of the vitreous, though it may not have acidosis as its cause, may be caused by a poison circulating in its nutrient medium. What that poison is is another question. Those who hold that we would be better without a colon might say it was a poison generated in the colon. Glaucoma cases in my experience are far from being necessarily subjects of chronic troubles of the colon. But we do

know that there are definite local œdemas caused by definite poisons circulating in the blood.

To restate the view which I regard as much the most rational yet advanced: that glaucoma is due to an autogenous toxin which has a special selective affinity for the vitreous, thus causing an œdema of that body. This œdema presses forward the lens zonula and iris and presses on the ciliary body, thus bringing into action the mechanical factors on which so much stress has hitherto been laid as the cause of glaucoma.

ILLUSTRATING DR. VERHOEFF'S ARTICLE ON "HISTOLOGICAL FINDINGS AFTER IRIDOTASIS"

Section Passing through the Middle of the Site of Operation

Photo. × 10

HISTOLOGICAL FINDINGS AFTER IRIDOTASIS.

By Dr. F. H. VERHOEFF, Boston.

(From the Massachusetts Charitable Eye and Ear Infirmary.)

(*With one illustration on Text-Plate I.*)

THE operation iridotasis, a modification of Holth's iridencleisis, was first described by Borthen[1] in 1910. It consists, briefly, in withdrawing the iris through a keratome incision beneath a large conjunctival flap and allowing it to remain there. The iris is grasped near the pupillary margin, so that when it is withdrawn the pigment epithelium is opposed to the anterior lip of the wound and thus prevents the latter from uniting with the iris. In chronic non-inflammatory glaucoma, the operation in the hands of Borthen has given almost uniformly successful results. According to Borthen, it reduces the intraocular pressure partly by providing drainage beneath the conjunctiva and partly by stretching the iris and thus freeing the filtration angle and opening the iris crypts.

The operation is so simple that if it proves equally successful in other hands it should largely supplant the various sclerostomy operations. The danger of late infection would seem to be no greater than after the latter operations. On the other hand, the danger of sympathetic uveitis may prove to be greater than after sclerostomy, but, judging by Borthen's cases, it must be negligible.

So far as I know, a microscopic examination of an eye upon which iridotasis has been performed has not hitherto been

[1] J. Borthen, "Operative Glaucombehandlung," *Arch. f. Augenheilk.*, 1910, lxv., p. 42; these Archives, 1911, vol. xl., p. 405.

made. The following case, in which such an examination was made, shows one of the ways in which the operation may fail.

CASE.—W. T., male, aged 74 years, was admitted to the Massachusetts Charitable Eye and Ear Infirmary June 19, 1915. About seven years ago he discovered for the first time that he was blind in the left eye. Previous to one month ago he had no pain, but since then he has had recurring attacks of severe pain in the left eye, and it has become greatly congested. The sight of the right eye has gradually failed during the past seven years, but this eye has always been free from pain and congestion.

Examination: Left eye. Marked pericorneal congestion. Cornea steamy. Anterior chamber slightly shallow. Pupil, semi-dilated, does not react. Fundus not visible owing to corneal haze. Tension 80*mm*. Vision, *nil*.

Right eye. No congestion. Cornea clear. Anterior chamber shallow. Pupil semi-dilated, reacts normally. Disk deeply cupped. Retina shows numerous hemorrhages around the macula. Retinal vessels sclerosed. Tension 40*mm*. Vision with + 1.50 Sph. = $\frac{20}{50}$.

June 24th. An iridotasis was performed upon the left eye without incident. Atropine instilled.

The inflammatory condition then promptly subsided and the pain disappeared. The anterior chamber was re-established within forty-eight hours. One week after the operation there was a good bleb at the site of the iridotasis; the cornea was clear and the tension normal. Atropine was discontinued, and the patient discharged.

July 20th. Patient readmitted. States that he has had recurring attacks of pain for past two weeks. Cornea hazy; eye congested and very painful; tension 70*mm*. Conjunctiva now shows no œdema at site of operation and is closely applied to the cyst formed by the iris.

July 24th. Enucleation of left eye under local anæsthesia, by Dr. Halliday.

PATHOLOGICAL EXAMINATION.

The globe is normal in size and shape except that at the site of the iridotasis there is a definite bulging. The cornea is clear. The anterior chamber is of normal depth and free from coagulum, but contains a small hyphæmia. The lens completely fills the zonular space. The retina and choroid are *in situ*. The retina shows a few small hemorrhages

around the disk and at the equator. The vitreous is clear and otherwise normal.

Histological Examination: Serial sections were made through the site of the iridotasis. Longitudinal sections were made of the optic nerve nearly to the central vessels, the remainder of the nerve then being cut in serial cross-sections.

Sections passing through the middle of the operative wound show the following: The keratome incision is 1.5*mm* from the canal of Schlemm. Both lips of the wound are curved slightly outwards, leaving a narrow free space through which the iris bulges. The iris cyst thus formed is in free communication with the anterior chamber. Posterior to the wound the iris is firmly united with the cornea, and greatly thinned. On the anterior lip of the wound the pupillary margin of the iris reaches all the way to the cut edge of Descemet's membrane. Neither of the wound surfaces shows any reaction beneath the iris, which is lightly adherent to them.

Outside the corneo-scleral opening the iris is surrounded and fused with a thick layer of new-formed fibrous tissue which gradually loses itself in the episcleral tissue. This new tissue, which evidently has arisen chiefly from the episcleral tissue, is still in a state of active proliferation. It is rich in fibroblasts and is moderately vascularized, but is notably free from infiltration with chronic inflammatory cells. It shows no œdema. The subepithelial tissue over it, however, shows slight traces of œdema. The main bundles of the sphincter muscle are seen, not at the pupillary margin, but at the summit of the cyst, evidently as the result of the stretching to which the iris has been subjected. On the inside of the cyst, the pigment epithelium is intact except for a few small defects. In one place the epithelium is lifted up by serum. The cavity of the cyst contains a few red blood corpuscles but is otherwise apparently empty.

Serial sections passing through the ends of the corneo-scleral wound show the latter firmly healed, so that all possible drainage of aqueous humor around the cyst into the subconjunctival tissue has been completely closed off.

Examination of the remainder of the eye shows peripheral anterior synechia, moderate fibrosis of the iris with beginning ectropion, slight atrophy of the ciliary body, atrophy of the retina, retinal hemorrhages and œdema, deep glaucomatous excavation of the optic disk filled up to the normal level with connective tissue, complete obstruction of the central artery due to endarteritis, and almost complete obstruction of the central vein due to endophlebitis, the lumen being reduced to less than capillary size.

It will be seen that this was a case of advanced chronic congestive glaucoma, just the kind of case in which Borthen states the operation is apt to fail. The obstruction of the central vessels and the retinal hemorrhages were clearly secondary to the glaucoma, so that the case was not one of ordinary hemorrhagic glaucoma. It is possible, however, that it was to the obstruction of the central vessels that the final high tension and resulting congestive condition were due. For about the first two weeks after the operation the result was most satisfactory. There was a well marked bleb over the wound, the cornea was clear, the pain and congestion had gone, and the tension was normal. Then the tension returned and the eye was removed, thirty days after the operation.

Interpreting the conditions found microscopically by the clinical course of the case, the sequence of events must have been as follows: For a certain time after the operation the pupillary margin of the prolapsed portion of the iris was entirely outside the corneo-scleral wound. While this condition obtained, drainage took place into the subconjunctival tissue and kept the intraocular pressure low. Gradually, however, the traction of the sphincter pulled the pupillary margin downward until it came into contact with the anterior lip of the wound and adhered to it. As a result, all drainage was cut off and the prolapsed iris formed simply a distended cyst. It is possible that a subconjunctival incision into this cyst might have relieved the condition, but the patient preferred enucleation to further attempts to save the eye. The amount of inflammatory reaction about the wound was notably slight. The fibrous tissue formed around the prolapsed iris was no doubt due simply to the distention of the latter.

More recently, Borthen[1] has modified his operation by excising a small piece of the prolapsed iris, taking pains to avoid the sphincter. Judging by the findings in the present case it would seem advantageous to include the sphincter in the piece of tissue excised. It remains to be seen, however, whether such additional traumatism to the iris will not be more likely to excite an inflammatory reaction and close off filtration than the unmodified iridotasis.

[1] J. Borthen, "Eine kleine Besserung der Iridotasis Antiglaucomatosa," *Arch. f. Augenheilk.*, 1911, lxix., p. 398.

LUMBAR PUNCTURE AND EXAMINATION OF THE SPINAL FLUID IN AFFECTIONS OF THE EYE.[1]

By JAMES B. AYER, M.D., Boston, Mass.

IT is my privilege to present the results of examination of the spinal fluid in a group of cases of common interest to neurologist and ophthalmologist, together with effects of treatment in certain of the syphilitic ones. The cases have for the most part been seen both in the Nerve Room of the Massachusetts General Hospital and at the Massachusetts Eye and Ear Infirmary; to these have been added private cases, many of which have been referred to me, first or second hand, by ophthalmologists.

The recognition of the value of the examination of the spinal fluid has steadily increased, and its sphere of importance has gradually enlarged since its inception by Quincke twenty years ago. At first employed almost entirely in cases of acute meningitis, it was later found that chronic inflammatory changes in the nervous system could be diagnosticated also, and later still it became possible, by this means, to differentiate the large and important group of nerve syphilis from other conditions. Nor has the spinal route been used solely for diagnostic purposes, for, as is well known, some of the most satisfactory medicaments are now given into the subdural space. Our problem to-day is to differentiate more carefully, by means of the spinal fluid, types of inflammatory and degenerative disease of the nervous system; and this method of investigation should be of the utmost interest to the

[1] Presented by invitation at the meeting of the American Ophthalmological Society, July, 1915.

eye specialist, in that he alone so often has the first actual view of the nervous system.

While the inflammatory conditions are the most readily diagnosticated to-day, much light may be thrown upon other conditions from examination of the spinal fluid, *e. g.*, as to the nature of cerebral hypertension, and we may, I believe, confidently look to the future for aid in diagnosis of other conditions, particularly those disorders of internal secretions, inter-related, but ill understood.

The paper is based on the examination of 160 cases of concern to the ophthalmologist, with a background of a much larger number of less special interest. As has been hinted at, our problem in the greater number of cases was simply, Is this case syphilitic or not? In some the examination was intended to be only confirmatory, or for the sake of following the effect of treatment; in others the diagnosis depended upon the findings, and, if I may anticipate a little, I believe that the greatest value of puncture is to be found not in examination of an out-and-out case of tabes or evidently syphilitic optic atrophy (this is like using a thermometer in a clear case of fever), but its use in a case of slightly unequal or irregular pupils, perhaps with sluggish reaction, in early diplopia, with or without evident palsy, suspected beginning atrophy, and of certain forms of headache, epilepsy, and migraine. In these latter a syphilitic process will often show in the spinal fluid even more conclusively than in the later stages, though evident then at a glance. Let us then take up in turn the various groups of cases in which we have examined the spinal fluid, and see what we can learn from them; and first the large group of external oculomotor palsies of all kinds, partial and complete, for the most part of some permanence, and not transitory.

EXTERNAL OCULAR PALSIES.

There were forty cases of this character. In many the tests were performed as one extra link in the diagnostic chain of tabes, but in at least eleven the tests were of prime importance in the diagnosis of the case, the oculomotor palsy being the sole sign. A typical example of such a case is illustrated by K. C., aged forty-seven years, who awakened one morning

with the right eye closed. Examination showed only third-nerve palsy; blood test gave a negative Wassermann, but the spinal fluid gave a strongly positive reaction and a goldsol reaction in the syphilitic zone. Not only is the examination of confirmatory value, however, where you suspect syphilis. In the case of Mrs. A. G., all examiners diagnosticated cerebral syphilis, and the spinal fluid seemed to confirm this in that there was increased number of cells, though the Wassermann was negative. Salvarsan was freely given, but the patient continuously grew worse, so that other cranial nerves became involved, and later one side of the body; a mass appeared in the ethmoid region which showed carcinoma, and our diagnosis had to be changed to tumor, thereby agreeing with the dictates of the spinal fluid examination.

Of the forty cases, all except five show evidence of meningeal irritation, as demonstrated by increase of number of cells per centimeter, increased proteids, a positive Wassermann reaction or gold chlorid test, and usually more than one. That is, only five cases show normal spinal fluids; of these, one was really a case of subjective diplopia and has been helped by psychotherapy; another has signs indicative of nerve syphilis, but these signs were the same in 1915 as in 1908, and he has no symptoms suggestive of a progressive process. In the case of two others no cause has been found, yet no other signs of syphilis have been noted. In the fifth case the spinal fluid was normal and the blood showed a positive Wassermann. This was the case in a young girl, recently married, and probably denotes a manifestation of acute vascular syphilis rather than of cerebrospinal infection.

Five others, while showing pathologic fluids, fail to show the specific reaction for syphilis. Three are evident cases of tabes, but the tests were done before the days of the reenforced antigen; the fourth case was that of cerebral tumor above mentioned, and the fifth has been considered polioencephalitis.

To summarize the cases of oculomotor palsy: In those not congenital or with other obvious cause, usually a manifestation of syphilis of the nervous system. If all tests, blood and spinal fluid, are absolutely negative, the case is probably not syphilis, or represents a run-out process, the signs of which should be

evident. In our experience oculomotor palsies due to an active syphilitic process are revealed by both positive blood and spinal fluid tests; occasionally the former is more reliable, but more often the latter.

PRIMARY OPTIC ATROPHY

In forty-four cases of primary optic atrophy we find only twelve spinal fluids with normal findings, but in four of these the tests were performed after antisyphilitic treatment, the blood having shown previously a positive Wassermann. Of the six cases where blood and spinal fluid both were negative, three were hardly thought to have been positive, for in one case tobacco played a large part; in another lead was demonstrated, and in a third there was a distinct family amaurotic tendency. A fourth exhibited atrophy of the superior half of her optic disk only, a condition not resembling the syphilitic atrophies. In two of this group were we surprised in our findings. Mr. G. M. had the usual signs of well-marked tabes, including Argyll-Robertson pupils; he had, however, had no symptoms referable to this disease or any other disorder until, a short time before being seen, he had suddenly lost the sight in one eye. In the routine of an out-patient examination he was naturally set down as tabes with optic atrophy, with the usual bad prognosis. The report of the examination of blood and spinal fluid being absolutely negative, made us reconsider the history, and the following opinion of the patient seems a fairer one: The man had had tabes, leaving him with the signs of the disease, but, as there were none of the usual symptoms, and in view of the negative tests, it seemed fair to consider the pathologic process as quiescent. He has evidence of arteriosclerosis, with high blood-pressure; the optic atrophy was one-sided and sudden in onset, probably a vascular cause for this, quite unlike the slow progress of a tabetic atrophy. We have evidence of syphilis as the probable cause of the arteriosclerosis. What, then, will be our prognosis after having performed the tests? Not a progressive, crippling, blinding disease, as we had expected, but a condition which might remain unchanged for many a year. We can, I think, safely assure him that the other eye is in no more danger than is any other part of the body in the presence of arterio-

sclerosis, and our treatment will be prophylactic in nature, rather than heroically antisyphilitic. This case is cited at length in order to give an idea of the reasoning which seems fair when all the facts are known, and the last fact, and sometimes the most important, is the examination of the spinal fluid. I shall watch with interest the progress of this patient and so far—eight months—I am pleased to say there is no progress.

In another patient the typical reactions were expected which would confirm a diagnosis of tabetic optic atrophy. My suspicions were aroused that all was not as expected as soon as the canal was entered, for the spinal fluid mounted higher and higher into the manometer, until the alarming height of 360*mm* had been reached. I was not comfortable that night, nor was the patient, as he gasped for breath, with pulse in the fifties, and it was not necessary to have a negative Wassermann and excessive protein content of the spinal fluid to tell me that we were dealing with a case of brain tumor. In reference to this subject I may say that, in cases of heightened intracranial pressure, especially where there is a subtentorial tumor, avoid lumbar puncture, or do it only when there is much to gain, and then do it with your eyes open. I have had two other scares besides the above-mentioned one, and could show you the flattened medulla of one patient dying of respiratory and cardiac paralysis the day following lumbar puncture. The best contraindication of puncture is perhaps the presence of well-marked choked disk.

The optic atrophies (so-called "primary") which have come to my hand appear then to be mostly associated with a true nerve syphilis, as evidenced by a pathologic spinal fluid of syphilitic nature. As in the case of oculomotor palsies the blood usually runs parallel with the spinal fluid, but if I could have only one test, I should unhesitatingly choose the spinal. Normal tests, especially in cases where the atrophy has come on suddenly, are very strong evidence against its specific nature.

Concerning Treatment.—In the cases which show genuine involvement of the cerebrospinal system (by far the greater

number), we are dealing with a chronic progressive disease, usually of many years' standing, which exhibits a pathology both of exudation and of degeneration. Our task is considerable, namely, to stop the pathologic process. This result is, I believe, accomplished in some, but in many more we can only help symptomatically, and arrest the disease temporarily or partially. It is, as a rule, easy to overcome an oculomotor palsy, if taken early, by various medicaments, and, of course, these frequently disappear spontaneously—in one case a ptosis disappeared on withdrawal of a few cubic centimeters of spinal fluid. We have found, however, that the time-limit of such oculomotor palsy must not be over six months to obtain a complete recovery. As the paralysis is only one manifestation of a deep underlying process, our treatment must not stop at this—in fact, our task has only just begun. We must persist until not only symptoms are gone, but the spinal fluid has been reduced to normal, if possible.

As for the optic atrophies of specific origin: I am not encouraged about them. Many were treated by all means at our disposal, without arrest of the process. If taken when far advanced, I believe the outlook absolutely bad; if taken early, and the process is proceeding slowly, there is a chance that salvarsan will help.

OPTIC NEURITIS AND CHOKED DISK

As has been said before, I am chary of tapping patients with choked disk. We have, however, ten cases on whom lumbar puncture was performed at the time of the acute process, five of whom were shown to be syphilitic; we have, moreover, three other cases in whom the blood showed syphilis, the spinal fluid not being tested. As the blood Wassermann almost always runs parallel with the spinal fluid findings in these cases, on account of the possibility of increased intracranial pressure, it seems to me unwise to perform puncture in these cases unless there is some very good indication; the blood will usually be sufficient guide.

In contradistinction to the two preceding groups, it is gratifying to see the rapidity with which these cases, of syphilitic origin, clear with salvarsan. A. C., aged twenty-five years, one year after contracting syphilis, had a prolonged

attack of unconsciousness, and six months later, when seen by me, had choking of both disks. Tests positive for syphilis, with evidence of a marked meningeal irritation, as shown by 110 cells per *cmm*. After three doses of salvarsan of 0.3*gm* each, the fundi were of normal appearance. In six months more his fluid had been reduced to nearly normal. I have followed him for two years since then, and there has been no return of optic neuritis or any symptom traceable to syphilis; his blood and spinal fluid have remained essentially normal during this time. V. Z., aged twenty-eight years, complained of failing vision for eight months. He showed marked injection of the disks, concentric contraction of the fields, and pupils which reacted neither to light nor to accommodation. Tests were all positive for syphilis, the spinal fluid especially strong. It took four months of salvarsan treatment (eight injections intravenously and three intraspinally) before his disks were clear, and six months later his pupils reacted to accommodation. One year later, without more treatment his vision was $\frac{20}{50}$ and $\frac{20}{30}$, his fundi clear, but his pupils still of the Argyll-Robertson type.

Very different is the case of E. C. B., who gave negative Wassermann tests, but whose cell count remained high in spite of seven doses of salvarsan, and whose eyes went on to atrophy despite treatment. We have since been forced to abandon our diagnosis of syphilis in his case for that of tumor. One case, giving essentially negative findings, was treated, on the chance of being syphilis, with iodid and mercury, with rapid improvement, which has remained after three years. The tests, it is fair to say, done in 1912, were performed with the weaker reagent then in use.

In this group of optic neuritis, then, we have a right to rely upon our tests in differentiating syphilitic from non-syphilitic cases, and, for the most part, fortunately, the blood Wassermann is sufficient. Treatment, too, with older as with the newer syphilitic remedies is most gratifying, giving permanent improvement in symptoms and reduction of the pathologic process to normal.

ABNORMAL PUPILS.

To the writer the most interesting and the most valuable part of this subject centers about the abnormal pupil. General

practitioners and specialists in all fields are or should be deeply interested in the study of the pupil. Of all manifestations of central nervous syphilis, the abnormal pupil is apt to be one of the earliest. But its changes are so various and often so slight that the physician is likely to be, on the one hand, too credulous, or, on the other hand, to overlook significant variations from the normal. Fortunately, the newer laboratory tests may with profit be used to determine in a given case whether or not a "specific pupil" indicates active syphilis or not. First let us consider the most important group:

The Argyll-Robertson Pupil.—This sign is generally considered as indicative of nerve syphilis, and only this. But there is a practical difference between syphilis of the nervous system in its active and inactive stages, and it is most important to discover with which we are dealing in a given case.

It is exceptional to find a well-marked case of advanced syphilis of the nervous system with normal pupils, and the Argyll-Robertson type is found so often as to require no comment. When it occurs alone, however, the sole sign and with no symptoms, then the physician is rightly puzzled as to its significance. I have examined thirteen such cases where this was the sole sign, with no symptoms at all or symptoms which were only distracting to the diagnostician. Of these, nine gave positive tests for syphilis, all except one strongly positive, usually both blood and fluid, so that the findings were unmistakable. M-. J. E. C., a man of fifty, became irritable and could not concentrate on his work; he had a feeling of pressure through the temples, and was to all intent a neurasthene. His pupils were small, irregular, fixed to light, but reacted to accommodation. Tests were all strongly positive. This in 1913; to-day, in spite of much intensive treatment, he is a patient at the McLean Hospital, a typical picture of dementia paralytica.

A physician at an institution was one morning accosted in this agreeable manner: "Why, doctor, your right pupil is dilated—you must have paresis." He consulted a neurologist, who found a typical Argyll-Robertson pupil and sent him to me for tests, which were strongly positive. Under thorough treatment with salvarsan, tests have been rendered almost

normal, and there is no evidence of advance of the syphilitic process.

Of four cases, however, which showed this type of pupil, tests were negative. What may we say of these? It is difficult to be dogmatic, but I believe they represent cases of arrested nerve syphilis, as seems quite certain in one, at least. On account of positive findings in the husband, the wife asked for an examination, which revealed typical Argyll-Robertson pupils. On reviewing her story she remembered that, ten years ago, on consulting an oculist for diplopia, he had been much interested in her eyes, saying that they did not react properly; that at this time she had had some "rheumatism," but that for the past ten years she had had absolutely no symptoms which might signify active tabes. Here, then, was almost certainly a case of tabes arrested in its early stages.

The same may be said, in a somewhat different sense, of ten other cases in which Argyll-Robertson pupils were found in conjunction with other signs and symptoms of tabes, but in which all laboratory tests were normal. These cases, for the most part, suffer from pain, but fail to show advance of the disease, as shown by the cropping-out of new symptoms. They are probably stationary, so far as activity of the pathologic process is concerned, though degeneration of nerve-fibers probably goes on. These are, for the most part, tabetics of long standing.

What is the importance of tests in this group, if Argyll-Robertson pupils always signify syphilis of the nervous system (and of this view I have no reason to doubt)? *It is in determining the stage of the disease*, whether it be an active, advancing process, or stationary and degenerative only, or dead and quiescent. In one case treatment may arrest the disease before it may fairly be said to have started; in the others there is no need of intensive antisyphilitic medication.

Irregular Pupils.—What can we say of irregular pupils? We have in our series cases with irregular pupils in whom tests are positive, and others in whom they are negative; but it is striking that, in the latter group, comprising thirteen cases, in seven there was either a history of lues or evidence of the disease. The negative tests, however, were useful in determining the importance of syphilis as an *active* factor in the symp-

tom for which the patient presented himself, and in none have I reason as yet to feel that a mistake was made in saying *Syphilis is not the causal factor here.* For example, G. S., a man aged forty-six, presented himself with a hemiplegia; he was euphoric, had a speech defect, his memory seemed poor, and his pupils were quite irregular. A diagnosis of early paresis was made. His tests were normal. This in 1913. If the diagnosis had been correct, he should now be well advanced and an unmistakable case; on the contrary, he is working, is much better than he was in every respect, and suffers only from the residual of his hemiplegia.

I was asked to examine A. M. because of bladder retention without evidence of local obstruction. The findings were, besides the retention, trabeculation of the bladder, irregular pupils, aortic roughening, and loss of sexual power, all very suggestive of syphilis. Both vascular and cerebrospinal tests were negative, and active tabes was excluded. Operation was undertaken in the hope of finding some local cause which had escaped the examiners, and a peculiar, valve-like middle lobe of the prostate, impossible of detection by the finger or the cystoscope, was removed, with complete relief of retention.

So, with irregular pupils, we should, I believe, consider them as very often the result of syphilitic infection, but whether or not they are associated with *active* syphilis, or with syphilis *involving the nervous system*, should be left for the tests to decide.

NORMAL PUPILS—POSITIVE TESTS.

Twelve cases present absolutely normal pupils, so far as ordinary examination is concerned, and yet were the subjects of active syphilis, seven undoubtedly with involvement of the cerebrospinal axis. For the most part these were cases of recent infection, though not always.

While, then, we may regard irregular and unequal pupils as placing the patient under suspicion of syphilitic infection, it does not aid in telling us of the activity of the process. Conversely, a normal pupil does not preclude the existence of a severe syphilitic process, either of the vascular or cerebrospinal systems.

I will not take more time to analyze groups and subgroups. The above "eye cases," seen from the neurologic point of view, seem to me instructive. To those of us who have followed the diagnostic and therapeutic course of these patients the employment of lumbar puncture has become a more and more helpful—I might almost say an indispensable—procedure.

MASSIVE GRANULOMA OF THE SCLERA (BRAWNY SCLERITIS), WITH THE REPORT OF AN UNUSUAL CASE.[1]

By GEORGE S. DERBY, M.D., Boston, Mass.

Pathologic Examination by F. H. Verhoeff, M D., Boston, Mass.

(With three illustrations on Text-Plate II.)

IN 1897, under the title of " Brawny Infiltration of the Conjunctiva and Sclera," Schlodtmann (1) added to the knowledge of scleritis in describing what is undoubtedly in clinical appearance and pathologic features a special disease, differing markedly from the anterior nodular scleritis so commonly seen in young adults affected with tuberculosis. Cases had previously been reported by Baumgarten (2) in 1876 and by Schirmer (3) in 1895, but neither had recognized the distinctive character of the disease. Since Schlodtmann's three cases, one of which was examined under the microscope, the following cases, all with pathologic examinations, have been reported: Friedland (4), Uhthoff (5), Parsons and Spicer (6), Prochnow (7), Wagenmann (8), Roosa and Oatman (9), Bietti (10), Komoto (11), Verhoeff (12), Gilbert (13), and Fleischer (14); and besides these a number of others are on record where the clinical picture suggested the disease, but where no satisfactory pathologic examination was obtained. Various other cases, notably those of Gayet, Coppez, Donald Gunn, Brailey and Kostenitsch (15), have been placed in the same category, but careful consideration of them shows that in all probability they do not belong here.

Brawny scleritis, renamed annular scleritis by Parsons (16),

[1] From the Massachusetts Charitable Eye and Ear Infirmary. Read at meeting of the American Ophthalmological Society, New London, July 15th.

ILLUSTRATING DR. DERBY'S ARTICLE ON "MASSIVE GRANULOMA OF THE SCLERA"

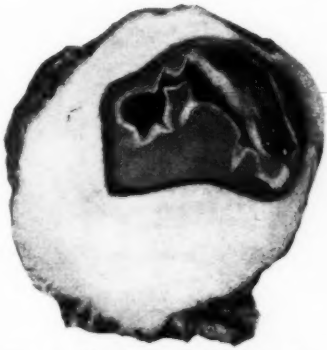

FIG. 1.—Massive granuloma of sclera, showing enormous thickening of sclera. Globe sectioned in vertical plane passing through outer third.

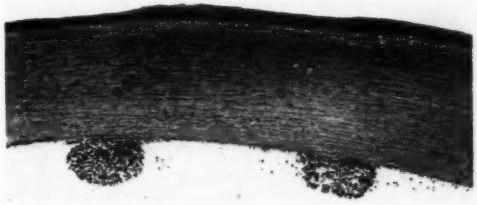

FIG. 2.—Massive granuloma of sclera. Precipitates on posterior surface of cornea. (Photo × 35.)

FIG. 3.—Massive granuloma of sclera. The lens has been removed. Note lymph-follicles in choroid and orbital tissue. Also exudate on pars plana ciliaris below. (Photo × 4 Reduced one-fourth.)

and also known as gelatinous scleritis, usually appears typically, and in the classic case, as a gelatinous, brownish-red infiltration of the conjunctival, episcleral, and scleral tissues, most marked close to the limbus. The succulent swelling often overhangs the cornea and extends back a variable distance from the limbus, even to the equator and farther. In the diseased area there is enormous dilatation of the blood-vessels and lymphatics. Pain and tenderness are acute. As the process advances the cornea is involved in the form of a deep, interstitial opacity, always advancing until no clear tissue remains. This infiltration is accompanied by the formation of deep and also superficial blood-vessels. As the disease extends anteriorly, so also it penetrates into the deeper membranes of the eye, and almost invariably the uvea takes a greater or less part in the process. Synechiæ, corneal precipitates, vitreous opacities, and even retinal separation may be found. The sight fails, pain becomes acute, and finally the globe comes to enucleation. The progress of the disease is characterized by its extreme chronicity and by its acute exacerbations and remissions.

Although the majority of cases reported are of the classic type first described by Schlodtmann, it is now recognized that the clinical picture may vary according to the severity of the process, and to the part of the eyeball principally affected. Thus, the changes may be most marked in the posterior half, as in the case of Wagenmann and in the one here reported. The uveal involvement may be severe or nearly absent; the retina may show extreme changes with marked separation, as in Fleischer's case, or be comparatively little affected. Pain is usually a marked and distressing feature coming on in severe attacks. Tension is most often increased, but may be diminished, according to the stage in which the disease is seen. The red, succulent swelling is characteristic, but by no means always present, and in many cases the diagnosis is made only after enucleation has been performed. Again, in some instances, the early picture cannot be distinguished from that of anterior nodular scleritis.

The prognosis is grave, as the eye usually comes to enucleation on account of pain and loss of sight. In a large majority of cases but one eye has been affected; in three, however, the

sight of both eyes was practically lost (Schlodtmann, Uhthoff, and Prochnow), while in two more (those of Verhoeff and Baumgarten) the second eye was mildly affected.

Etiology.—The etiology of this disease is still an open question. In the majority of cases no definite cause could be made out. There are but few definite facts to be found if we analyze the cases.

Gilbert believed gout to be the cause, as he found lesions of that disease elsewhere in his patient. Against his view it may be pointed out that in no other case have gouty manifestations been evident, that the pathologic examination of his case does not support his view, and that in the case to be reported here examination of the blood for uric acid showed a normal content.

Bietti believed his case to be due to tuberculosis, and points to some suggestive features in the histologic examination to bear out his contention. In the discussion of Bietti's case Axenfeld was able, on the basis of a case of his own, not pathologically examined, to give some support to this view. Against tuberculosis, however, lies the evidence of all the other reported cases and tha. of the microscope. Tubercle bacilli, though sought for, have never been found, and in no case has a positive focal reaction to tuberculin been obtained.

The microscopic picture gives more support to a diagnosis of syphilis than to any other disease, and yet in only one case, that of Verhoeff, was the Wassermann reaction positive. In our case and in those of Gilbert and Fleischer it was negative. The only evidence in favor of syphilis is the microscope, and that is inconclusive. A positive Wassermann reaction can be regarded as of little more importance in the diagnosis of a local lesion of this nature than is a general reaction to tuberculin without focal manifestation in the eye. The cause of brawny scleritis is still undetermined.

Age.—Basing our statistics on the sixteen pathologically examined cases, we find the age by decades as follows:

Age	Cases
Thirty to forty	2
Forty to fifty	2
Fifty to sixty	2
Sixty to seventy	4
Seventy to eighty	6

Thus, the average age of the sixteen cases is sixty-one and a half years. The oldest case is that of Verhoeff, seventy-six years; the youngest is ours, thirty-four years.

The following case is presented: F. S., female, teacher, single, age thirty-four years, of Fitchburg, Mass.

F. H., mother, had Bright's disease. Maternal aunt had pulmonary tuberculosis.

P. H., sickly child, measles, mumps, and scarlatina. Since sixteen years of age has been in good health. Best weight three years ago—134 pounds.

P. I., five years ago she had an attack of inflammation in the right eye (said to have been scleritis), which lasted one month. Two and one-half years ago the eye again became inflamed, and it has never become entirely normal since. During this time she has had considerable pain in eye and forehead. Early in July, 1914, she came to Boston to obtain advice as to her eye, and was seen by Dr. Myles Standish, who suspected a tubercular condition and referred her to Dr. J. B. Hawes, 2d, for general examination.

Dr. Hawes reported: weight 114 pounds; hemoglobin 85%; heart and lungs negative, except for faint systolic murmur. No glandular enlargement. Pirquet mildly positive. General condition poor, but nothing definitely abnormal found. Urine negative.

On July 14th she came to the infirmary and was admitted on the service of Dr. Verhoeff, with the diagnosis of scleritis. Examination of the right eye showed considerable injection of the ocular conjunctiva, some of the vessels being quite large; cornea clear; pupil regular, large, inactive (under mydriatic); anterior chamber normal. Tension normal. Ophthalmoscope shows vitreous opacities large and small. View of fundus cannot be obtained. Vision, $\frac{1}{200}$, not improved. The left eye was normal. Vision, -1.50 sph. $= \frac{20}{20}$.

Urine, 1020, no albumin or sugar. The Wassermann test was negative at this time, and in December. She did not react to 1*mgm* or to 10*mgm* of old tuberculin. After a second injection of T. O., 10*mgm*, the temperature rose to 99.8° F., and she felt a little out of sorts. There was no noticeable reaction, however, in the eye. Ten days after entrance in the hospital she developed a couple of small nodules in the conjunctiva. She remained in the hospital until September 14th without any definite change in her condition.

In August a second course of diagnostic injections of T. O. gave a second negative result.

On October 27th she was referred to the Tuberculosis

Class and came under my charge. At this time there was no essential change in her condition, there was no nodular thickening of the sclera, and the eye did not suggest a tuberculous scleritis. What was especially noticeable, however, was the very marked, I may say enormous, enlargement and tortuosity of the episcleral veins. The cornea showed a small, localized opacity; the tension was subnormal (8*mm*); there was a descemetitis, and the fundus could not be seen on account of vitreous opacities. During treatment in the Class for six weeks the case remained a puzzle. She was put on general building-up treatment, and reported once a week.

On December 3d a separation of the retina was detected downward, and transillumination over this area was faulty, although light was transmitted well over other portions of the sclera bordering on the limbus. A diagnosis of probable intraocular new-growth was made, and the patient was advised to have the eye removed. She acquiesced, and enucleation with implantation of a glass ball in Tenon's capsule was performed the next day. Healing took place without incident.

When the eyeball was sectioned and the nature of the disease became evident, in view of the recent findings of Gilbert and of Verhoeff in cases of this nature, it seemed desirable to use every effort to ascertain whether signs of either syphilis or gout were present.

On December 29th the patient was readmitted to the hospital, and on the following day blood was taken for a further Wassermann and for uric acid. Following this, she was put on a meat-free diet for twenty-four hours, and then was given 100 grams of sweetbread. Twenty-four hours later blood was again taken to be tested for uric acid. Our thanks are due to Dr. J. H. Pratt, under whose supervision the uric acid tests were made. Both tests for this substance were within normal limits, the second specimen showing 2.2*mgm*. The Wassermann was also negative. January 8th the patient was discharged and soon returned to her work.

PATHOLOGIC EXAMINATION BY DR. F. H. VERHOEFF.

The globe, including the thickened sclera, measures anteroposteriorly 30*mm*, horizontally 26*mm*, and vertically 26*mm*. Globe sectioned vertically.

The abnormal size and shape of the globe is found to be due to an enormous thickening of the sclera. This is greatest in the lower-outer quadrant posterior to the equator, where it forms an ill-defined nodule, 20*mm* to 27*mm* in

diameter and 13*mm* thick. The thickening is thus greatest in the vicinity of the inferior oblique muscle, but no trace of this muscle is found in the specimen. The sclera, however, is everywhere else greatly thickened except for a few millimeters immediately behind the limbus. The thickened tissue is very firm and slightly grayer in appearance than normal sclera, so that anteriorly the comparatively normal sclera can be seen to split up into bundles and lose itself in the pathologic tissue.

The cornea shows a faint old corneal opacity near the limbus and several punctate deposits on its posterior surface below; otherwise it is normal. After fixation, the anterior chamber is found normal in depth and free from coagulum. The filtration angle is not blocked by the iris. The pupil, 4*mm* wide, is round and free from membrane. There are two pigment spots on the lens capsule (artefact?), but no definite synechiæ. The iris is not noticeably thickened. The lens is *in situ* and clear. The vitreous chamber is reduced in size and is misshapen, owing to its compression by the thickened sclera (Fig. 1). The retina is separated almost everywhere, but remains adherent in places, especially above and in the vicinity of the disk. The irregular subretinal spaces are filled with clear serum. The vitreous is semifluid.

The ciliary body is everywhere greatly thickened, in some places to 2*mm*. There is no typical cyclitic membrane, but the surface of the pars plana below is coated with a firm, white layer about 1*mm* thick. The choroid is also greatly thickened. The thickening is greatest anteriorly (1.5*mm*) and gradually becomes less until near the disk it disappears. Within the choroid are numerous, round, gray spots. The optic disk is swollen. The nerve stem is intact, but on the outer side the dural sheath is involved in the overgrowth of tissue in the same way as the sclera.

Histologic Examination.—Fixation in 10% formalin, followed by a saturated solution of potassium bichromate, twenty-four hours; also by Levaditi's method for spirochætes, and Marchi's fluid. Celloidin embedding. Staining by a variety of methods.

The pathologic process is found to involve chiefly the sclera, the changes within the globe evidently being secondary. The sclera is everywhere affected, but least so near the limbus, where it is comparatively normal. As the sclera is followed backward its bundles are found to be more and more split apart by granulation tissue densely infiltrated with cells. These cells are almost exclusively plasma cells, and where the interstitial masses are small the granulation tissue is difficult to recognize. The granulation tissue is

giving rise to dense fibrous tissue, so that the extraordinary thickness of the sclera finally reached is due partly to an exuberance of fibrous connective tissue and partly to masses of granulation tissue and plasma cells between the connective-tissue fibers. In the thickest portion the fibrous tissue predominates. Within the cell masses occasional eosinophiles and a few lymphocytes are also seen. No giant-cells are present. Colloid globules, left by degenerated plasma cells, are abundant, and are brought out with especial prominence by the Gram stain. The new tissue contains no elastic elements that stain differentially.

The new tissue is not encapsulated at the periphery, but is rather sharply limited. Nevertheless, in places where orbital tissue has been left attached, the same inflammatory process can be seen extending into it, and the orbital tissue also shows isolated lymph-follicles. Near the disk, only the outer layers of the sclera are much involved. On the outer side of the nerve the dural sheath has been invaded by the inflammatory process extending from the sclera.

Within the new tissue occur here and there large lymph-follicles containing definite germinal centers and a few endothelial phagocytes. These are most numerous near the conjunctival surface. A marked feature of the specimen is the endarteritis of the blood-vessels. It is difficult to find a single artery in the body of the tissue that is not completely obliterated or collapsed. The thickening of the intima is due to proliferation of spindle cells, the nuclei of which stain feebly. It is evident, therefore, that the endarteritis is of a slow type. In the depth of the tissue, even functionating capillaries are infrequent, and dilated veins are absent. A few small areas are found considerably infiltrated with pus-cells, the largest being 0.25*mm* in diameter. In several sections an area of this kind shows definite caseation, the stroma staining deeply in eosin and the pus-cells showing chromatolysis and fragmentation of their nuclei. The Marchi specimens do not happen to contain any of these areas, and show only a few fat droplets within the granulation tissue.

The conjunctival and episcleral tissue, a small amount of which was left at operation, shows moderate œdema and marked infiltration with plasma cells. The veins are here greatly dilated. Some of the arteries show slight endarteritis, but in general the conjunctival vessels are free from intimal proliferation.

The cornea is normal except near the limbus, where the inflammatory process has extended for a short distance into its deeper layers. Below, stretches of granulation tissue and plasma cells extend between the lamellæ for a distance

of 1¼*mm* from the canal of Schlemm. On the posterior surface of the cornea there are a number of large precipitates apparently identical with those described by Fuchs in serous uveitis (Fig. 2). They are composed almost exclusively of large mononuclear cells, with round, or sometimes indented, nuclei, and many of them contain pigment. These large precipitates contain almost no plasma cells, but toward the limbus below there are increasing numbers of plasma cells adherent to the endothelium. The ligamentum pectinatum is densely infiltrated with plasma cells everywhere, and below the filtration angle is filled with these cells.

The root of the iris is beginning to adhere to the ligament below, and is densely infiltrated with plasma cells. Elsewhere the iris stroma shows relatively little infiltration and except for slight œdema is otherwise normal. Adherent to and possibly arising from the anterior surface of the iris are numbers of mononuclear cells, some of them pigmented, which here and there form small clumps. There are no synechiæ.

The ciliary muscle is everywhere highly œdematous and infiltrated to a greater or less extent with plasma cells, but the ciliary processes are almost normal. There is no ordinary cyclitic membrane anywhere, but on the surface of the pars plana there is a thick layer of new tissue which ends abruptly at the ora serrata. It consists of a dense mass of fibrous tissue, between the fibers of which are large collections of plasma cells, and contains a few blood-vessels, mostly of capillary size. A few small arteries showing obliterative endarteritis are seen within it. Beneath it the epithelium in places shows proliferation and in others complete disintegration. The tissue closely resembles the new tissue in the sclera. Probably it has resulted as a reaction against the plasma cells which had collected on the surface of the ciliary body here. Above there is a marked exudation of plasma cells through the epithelium of the pars plana, but no formation of membrane.

The choroid anterior to the equator is highly œdematous, the tissue spaces and subchoroidal space being distended with serum. It is also markedly congested. densely infiltrated with plasma cells, and here and there shows large perivascular nodules of lymphoid cells. At the level of the ora serrata, both above and below, it is invaded by granulation tissue extending into it from the sclera. Posteriorly it is less and less involved, and near the disk is practically normal.

The retina shows no marked changes. It is moderately œdematous, and anteriorly shows perivascular infiltration with lymphoid and plasma cells. The ganglion cells are

still present in considerable numbers. The optic disk is highly œdematous. The nerve stem is apparently normal.

Bacteriologic Examination.—The Levaditi method shows no spirochætes or other organisms. Sections stained for tubercle bacilli in carbolthionin and by the Gram method give negative results. No sporothrices can be found in sections stained by Mallory's connective-tissue stain.[1]

REMARKS.

The pathologic process in this case may be briefly described as a slow invasion of the sclera by granulation tissue extremely rich in plasma cells, associated with an abundant new formation of dense fibrous tissue. Within the new tissue are a few small areas of purulent infiltration and caseation. A marked feature is obliterative endarteritis. The involvement of the intraocular structures, while well marked, is relatively slight compared to the scleral process, and is clearly secondary to the latter. The partial separation of the retina is no doubt due to transudation of serum from the œdematous and infiltrated choroid.

The process is thus similar to, if not identical with, that found by the writer in brawny scleritis, differing only in degree. In the present case the new tissue is much more abundant, whereas the necrosis is insignificant when compared to that in Schlodtmann's and Friedland's cases of brawny scleritis. It is possible, however, that the necrosis is always due to the obliterative endarteritis. In the very early cases of Parsons and Oatman necrosis was not observed at all.

Judging by the histology of the lesions the inflammatory process in this case is also identical with that described as endothelioma of the optic nerve sheath by Parsons (17). Examination of sections of Parsons's case[2] shows the same exuberant growth of fibroid tissue, the same plasma-cell infiltration, the same extreme endarteritis, and the same kind of involvement of the sclera and dural sheath of the optic nerve as in

[1] B. S. Wolbach (personal communication) has recently found that this method stains the organisms well in sections of experimenal sporothricosis.

[2] By chance, three sections of Parsons's case given out as class specimens at the Royal London Ophthalmic Hospital were available for study and direct comparison with those of the present case.

the present case. It shows also numerous large lymph-follicles, which differ from those in the present case only in the fact that their germinal centers are more sharply defined. Possibly it is the undifferentiated lymphocytes within these that Parsons regarded as endothelial cells. His diagnosis of endothelioma, however, was only a tentative one, and the writer can find nothing in the sections in his possession to substantiate it. Clinically, Parsons's case differs somewhat in the situation of the inflammatory process, but there is no apparent reason why the same process should not chiefly involve or begin in the posterior part of the sclera or even in the dural sheath of the optic nerve.

As to the cause of the condition, the pathologic examination of the present case furnishes no conclusive evidence. It would seem, however, to exclude tuberculosis and all the known infectious processes except syphilis. In this particular case the massive formation of fibrous tissue somewhat suggests a fibroma, but the marked chronic inflammatory reaction associated with it would seem to rule out this possibility. Still another possibility is that the process represents a scirrhous lymphoblastoma. In fact, from the histologic examination alone this cannot be definitely excluded, although it is, *a priori*, improbable that such a tumor should arise in the sclera.

For a more detailed discussion of the pathologic lesions of this disease, reference is made to Verhoeff's article. From his examination of sections from four previously reported cases, those of Schlodtmann, Friedland, Parsons, and Roosa–Oatman, he concludes that the scleritis is the primary lesion, while the involvement of the other ocular tissues takes place secondarily, and the present case furnishes no ground for changing this view.

This case is characterized by a chronic inflammatory process in the eye lasting over a period of five years. The clinical picture was that of a rather mild scleral inflammation with an accompanying uveitis, and in the later stages an extreme engorgement of the episcleral vessels, even more marked than that ordinarily seen in absolute glaucoma. The appearance of the eye suggested a high tension, but it was always soft to the finger, and the tonometer readings were a low normal or

below the normal limit. In spite of the low tension there was no sign of shrinking. On the whole, pain was not marked. The pathologic examination showed a relatively enormous scleral thickening composed of new fibrous tissue, granulation tissue, numerous plasma cells, with a few small areas of necrosis and caseation and marked obliterative endarteritis. The changes were most marked in the posterior half of the eyeball. Pathologically, the changes found in every respect resemble those found in brawny scleritis, although the scleral thickening is much greater than in any case previously described.

The only other case in which the posterior half of the eyeball was more markedly affected than the anterior is that of Wagenmann described as posterior scleritis. Wagenmann, however, recognized that the lesions described by him were characteristic of brawny scleritis.

Perhaps the enormous production of fibrous and granulation tissue in this case, in contradistinction to the others, was due, in part at least, to the patient's age, thirty-four years, whereas the average is sixty-one and a half years.

An especially interesting feature of the case lies in the fact that, although in the classic case of brawny scleritis, as first described, the disease affects by choice the anterior part of the eyeball and reaches backward to the equator and forward into the cornea, here the part of the sclera least involved was that adjacent to the limbus, except in the region below the cornea.

A study of the cases of brawny scleritis leads to the conclusion that the clinical picture of the disease must be enlarged to cover a much wider range than that originally described by Schlodtmann. It will vary according to the seat of the disease anteriorly or posteriorly, according to the severity of the process, and according to the degree in which the uvea takes part. Verhoeff makes the interesting observation that the massive formation of fibrous tissue in this case somewhat suggests a fibroma, but that this diagnosis may be ruled out by the marked inflammatory reaction.

In this connection, an observation in the literature by Saemisch (18) is of interest.

> Female, aged ten years. For two years loss of sight; for six weeks blindness and pain in eye and head. Only in this last period was a change in the appearance of the eye noted.

O. S., slight swelling of lids, several large and tortuous veins in conjunctiva of globe, deep subconjunctival injection at limbus, cornea slightly cloudy, anterior chamber shallow, it is discolored and greenish, pupil enlarged and presents a gray-yellow reflex. A mass presenting two prominences seen behind the lens, one prominence on the right and one on the left, but they meet in vertical meridian. Tension+; 18*mm* of protrusion movements curtailed. Vision nil. Diagnosis, intraocular tumor, enucleation. No recurrence in two and one-half years.

Pathologic Examination.—Retina totally separated. In region of papilla, retina and choroid grown together and form a *2mm* thick mass. Subretinal space filled with a yellow, cheesy mass, made up of round cells. From the entrance of nerve to the inner side extends a thick tumor $10 \times 8 \times 5mm$, intimately connected with the sclera, which looks normal. In the region where the retina and choroid were grown together there were several areas of round cells. The tumor consisted of fibrous tissue and cellular elements between the fibers. Diagnosis, fibroma of sclera and fibroid degeneration of the retina and choroid.

It is not impossible that this case is one of brawny scleritis. Certainly, the inflammatory reaction here would seem to rule out a simple fibrous tumor.

My excuse for presenting this communication, based on a single case, lies in the great rarity of the disease, its obscure causation, and on the fact that it has not previously been discussed before this Society.

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TORTICOLLIS RELIEVED BY TENOTOMY OF THE INFERIOR OBLIQUE.[1]

By Dr. ALEXANDER DUANE, New York.

(*With seven illustrations.*)

IN March, 1915, I saw the following case at the Herman Knapp Memorial Hospital.

History.—Hortense S., now aged 3 years and 9 months, has tilted her head to the right shoulder since she was four months old. This statement of her mother's is corroborated by a series of photographs, the first taken when the child was seven months old, the last (see Fig. 1, A) representing the condition at present. The tilting has been constant and about the same in amount since it was first noticed. Since the age of six months treatment by orthopedic apparatus and electric massage has been used without result. At the age of two, *when the head was straightened by means of a brace*, it was first noticed that the left eye deviated up. The mother, suspecting that the eyes had something to do with the difficulty, tried three weeks ago the effect of bandaging the left eye. The child *immediately held its head straight.*

Status Præsens.—Head tilted markedly to right shoulder and turned somewhat to right. When the head is in this position screen test (alternate covering) shows a left hyperphoria of about 10°. When the head is held straight this hyperphoria increases to over 20°. Hardly any lateral deviation in associated movements up and right. With the right eye fixing, left eye shoots high up; and the same happens when the eyes are directed far to the right on the horizontal plane. In other directions of the gaze, and particularly in the lower field both to the right and to the

[1] Patient presented at meeting of the Section on Ophthalmology, New York Academy of Medicine, May, 1915.

left, there is little deviation and the movements of the eyes are comitant.

DIAGNOSIS.—Congenital insufficiency of the right superior rectus; fixation with this paretic eye; sharp secondary deviation upward of the left (sound) eye. Tilting of head in order to bring vertically displaced images more on a level.

OPERATION.—On April 9, 1915, complete tenotomy of the left inferior oblique at its origin.

RESULT.—April 29, 1915, head nearly straight; only a few degrees of left hyperphoria by screen test. Photograph (Fig. 1, B) taken early in May shows degree of improvement. Child presented before Ophthalmological Section of New York Academy of Medicine, May 17th, and case reported in discussion of Dr. Posey's paper on tenotomy of the inferior oblique, read before the American Ophthalmological Society.

FIG. 1, A.—Before operation.

FIG. 1, B.—After operation.

Dr. Posey in the paper just referred to quoted largely from an unpublished paper of mine read before the British Medical Association in 1906. In this I cited several cases in which I had done tenotomy of the inferior oblique and formulated the indications for the operation. In the discussion of Dr. Posey's paper I stated that the most important of these indications were, first, paralysis of the superior rectus, congenital or traumatic, with fixation with the paretic eye and consequently secondary deviation of the inferior oblique in

the opposite eye; and, second, paralysis of the superior oblique, with secondary deviation of the inferior oblique in the same eye. The former condition is rather frequent as a congenital anomaly. I think I have seen about forty cases. The picture is characteristic, so that the diagnosis can be made in some cases even at the age of a few months. In a case of right-sided paralysis, for example, as soon as the patient looks to the

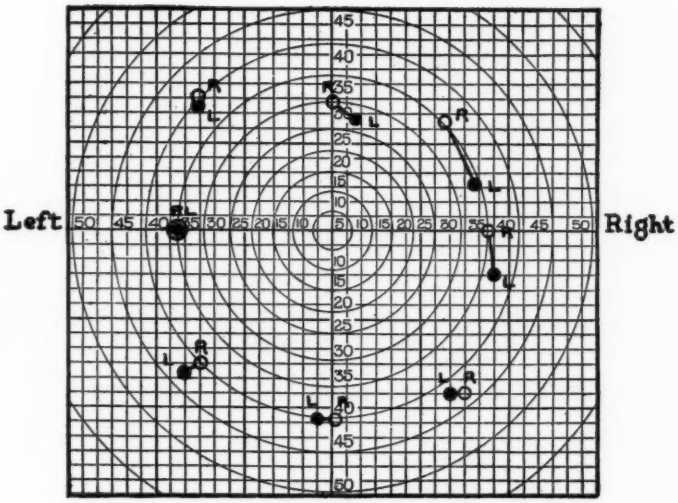

FIG. 2.—Diplopia in congenital paralysis of the right superior rectus, with consecutive spasm of the left inferior oblique. Double images projected on a tangent plane at a distance of 30 inche . L, image of left (fixing) eye; R, image of right eye.

right, the left eye shoots obliquely upward. The patient avoids looking to the right, and, to evade diplopia, either shuts one eye or turns the head to the right and tilts it. In looking to the right, and especially upward and to the right, characteristic diplopia develops. This is well shown in Fig. 2.[1]

[1] In this, to be sure, the non-paretic eye was the one that fixed. The diplopia, however, would have been the same—only greater—if the paretic eye had performed fixa ion.

Paresis of the superior oblique, with secondary deviation of the inferior oblique in the same eye, is another indication for tenotomy of the inferior oblique. The diplopia before and after operation in a case of this sort, in which the opera-

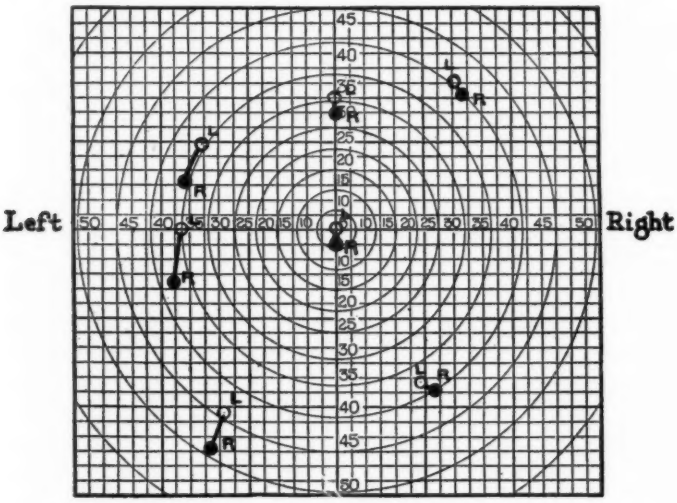

FIG. 3.—Paresis of right superior oblique and spasm of right inferior oblique. Relation of double images. (Before operation.)

Double images plotted on a tangent plane at a distance of 30 inches. Circle (L) denotes image of left (fixing) eye; black dot (R), image of right eye. Note the vertical (right) diplopia, which is marked in the whole of the left half of the field of fixation and is about equally great in the upper and in the lower field (characteristic diplopia in left upper and left lower quadrants). Note also how, in both upper and lower fields, the diplopia decreases as the eyes are carried to the right. There is, however, no true continuously maintained single vision anywhere, except perhaps in the extreme right portion of the field. In primary position, right hyperphoria of 4 degrees to 12 degrees, which, as the patient looks to the left, increases to 20 degrees. Right eye shows extorsion of 4.5 degrees.

tion was supplemented by a tenotomy of the inferior rectus in the other eye, is shown in Figs. 3 and 4. The result here was quite satisfactory, and was exceedingly so in another case, in which a very disfiguring up-shoot, due to this cause, was relieved by tenotomy of the inferior oblique alone.

A word as to the technic of the operation may not be out of

place. As indicated by Terrien, the incision is made at the intersection of the lower orbital margin with a perpendicular dropped from the supraorbital notch. It should be carried right down to and through the orbital septum, close to the

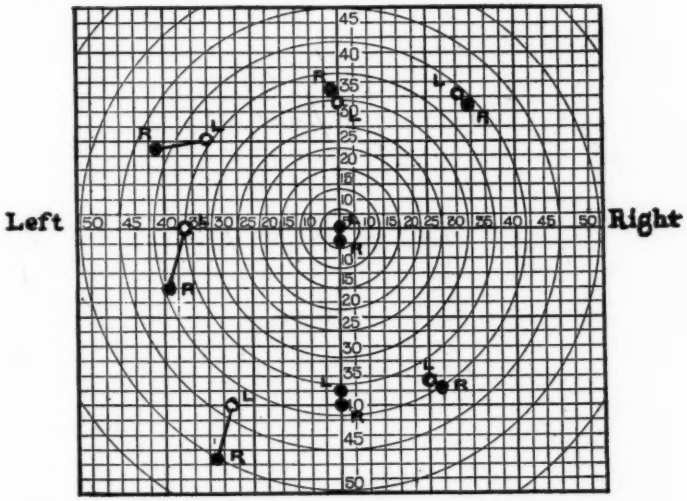

FIG. 4.—Paresis of right superior oblique and spasm of right inferior oblique. Double images after tenotomy of inferior oblique.

Same patient as in Fig. 3. Plot of double images taken five days after tenotomy of the right inferior oblique. Note that the vertical diplopia in the left upper quadrant is transformed into an almost purely lateral diplopia. while the vertical diplopia in other portions of the field is scarcely changed at all. This demonstrates the physiologic action of the inferior oblique, which acts mainly as an elevator, and whose elevating action is confined almost exclusively to the upper-inner quadrant. Note further tha the lateral diplopia produced by the operative paralysis of the inferior oblique is crossed instead of homonymous, as it should be, showing how little we can rely on he character of the lateral diplopia in diagnosticating paralysis of the elevators and depressors. Right hyperphoria in the primary position, still 5 degrees or 6 degrees, and still diplopia everywhere. Extorsion of right eye o.

orbital margin. In searching for the tendon, it is well to keep close to the floor of the orbit and well to the inside, so as to grasp the tendon near its origin and also to avoid the aponeurosis of the inferior rectus, which may be connected with the inferior oblique by strong slips of fascia. The inferior

oblique, more or less buried in fat and aponeurotic tissue, will be found if the hook is swept inward, with its point turned inward and upward.

The crude drawings, Figs. 5 and 6, taken from dissections I have made, show the anatomy of the parts involved.

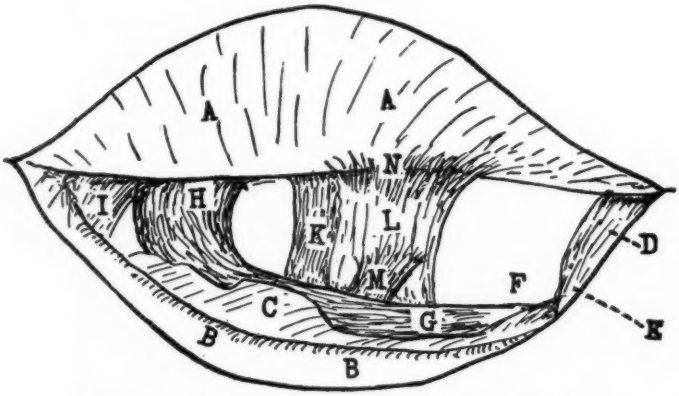

FIG. 5. A, A, cut lid-flap turned up and back, exposing orbital surface, B B, bony margin of orbit. C, orbital septum, mainly cut away. D. lacrimal sac, and E, lacrimal duct, lying in front of C, and therefore not in the orbit (the remaining structures shown—G, L, etc.—lie behind C). F, tendon of inferior oblique, about *2mm* long and situated at the point where Terrien's line (a line dropped perpendicularly from the supraorbital notch) intersects the lower orbital margin. G, belly of the inferior oblique, running almost horizontally outward in a mass of fat and fascia. At H turns abruptly backward, entering a fascial canal which lies directly beneath Tenon's capsule (see S, S, in Fig. 6). I, deep expansion of fascia running to Tenon's capsule. K, inferior rectus muscle almost completely covered by a fascial investment, L, from which run a slip (M) to the inferior oblique and other slips (N) to the lower lid.

Head-tilting is frequent in congenital deviations of this sort, but not often to such a marked degree as in this case, where it was mistaken even by an accomplished orthopedic surgeon for a true torticollis. It is evidently due to the involuntary attempt to get the double images on a level and thereby obviate the confusing effects of the vertical diplopia. The patient, in fact, has three ways of obviating this confusion. He may shut one eye; he may tilt the head; or he may diverge

or converge the eyes. All three methods are actually adopted. Very young children, affected with congenital paralysis, do at times shut one eye, evidently to shut out one of the double images. This expedient being too troublesome to keep up, they soon abandon it, and tilt the head instead. In a combined

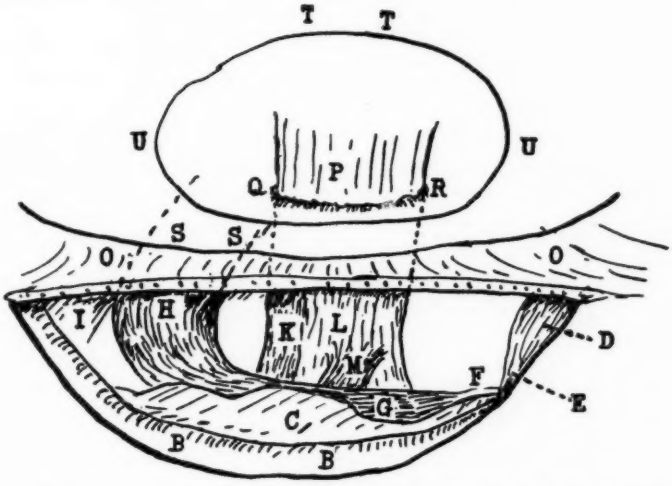

FIG. 6.—B to M as in Fig. 5. O, O, cut lid-flap held hori ontally forward so as to show skin surface. P, intracapsular portion of inferior rectus tendon (very short and attached by very few lateral expansions to the globe). Pierces Tenon's capsule in a regular foramen, Q R, with puckered edges. In immediate relation with Q the inner margin of this foramen, and lying directly beneath Tenon's capsule, is the inferior oblique muscle, here contained in a fascial canal (indicated by the dotted lines, S, S). T, T, U, U, cut edges of conjunctiva and Tenon's capsule (the two structures being fused at T, T).

lateral and vertical diplopia due to deviation of the eyes, tilting of the head to the right shoulder always depresses the right-hand image, whether that image belongs to the right eye or the left. Hence to relieve a right hyperphoria the patient tilts the head to the left, if the diplopia is homonymous, and to the right if the diplopia is crossed. When head-tilting fails to give relief, and partial or complete suppression has not occurred, the patient often involuntarily adopts the expedient

of diverging or converging the eyes, until the double images are so far apart as to be no longer confusing. In this way at the age of two or three or perhaps later a squint develops. Of the cases of acquired convergent and divergent strabismus that I have observed, quite a fair proportion have developed in this way, the acquired lateral squint being secondary to the congenital vertical deviation.

Head-tilting, sometimes carried to the point of false torticollis, may be produced by other congenital deviations, especially congenital paralysis of the inferior rectus. In one such case, a girl of twenty-two in whom there was a vertical deviation of over 30° due to a paralysis of the inferior rectus, and who had been treated unsuccessfully with orthopedic apparatus, I was able to relieve the very marked torticollis completely by an advancement of the inferior and tenotomy of the superior rectus.

As to the age at which operation should be performed, I think that this depends entirely on the symptoms. If these are at all pressing, I should operate early—even at the age of three or four years. I should thus operate if—(*a*) the up-shoot is very disfiguring; (*b*) wry-neck has already developed; (*c*) a secondary convergent or divergent strabismus is developing before my eyes. Of course, orthoptic exercises and correction of the refraction should first be tried in this as in other forms of strabismus; but, in my experience, it is just in these cases that these expedients fail and operation is necessary. In my belief it is important in such cases to relieve first the vertical deviation, which is really the cause of the lateral squint; and in cases like that of the little patient here cited, I would precede operation on the lateral muscles by a tenotomy of the inferior oblique.

DR. JAMES TAYLOR ON THE WORK OF HUGHLINGS JACKSON

At the opening meeting of the Section on Neurology, Royal Society of Medicine, on October 28th, its President, Dr. JAMES TAYLOR, dealt, in his address, with the work of Hughlings Jackson. The title of the paper was "The Ophthalmological Observations of Hughlings Jackson, and their Bearing on Nervous and Other Diseases."

He said he did not think it could be easy for anyone who was not brought intimately into contact with him, to understand the reverent affection always entertained, by those who enjoyed that good fortune, for the great personality of Hughlings Jackson. The speaker's object in this address was to stimulate interest in Dr. Jackson's writings, with their wealth of clinical observation, accurate scientific method, and broad philosophical grasp.

One of his earliest and most lasting interests was in ophthalmological and ocular conditions, and most of his early writings dealt with these, especially in reference to the symptomatology of intracranial tumors. Alterations in speech produced by disease also claimed much of his attention; and other departments of his activities included hemiplegia, chorea, and the syphilitic diseases of the nervous system, epilepsy, vertigo, and associated ear states. Jackson's series of treatises on the evolution and dissolution of the nervous system, though severely scientific, were yet intensely practical. In nervous diseases he was never tired of insisting on the necessity of routine ophthalmological examination. In his paper, contributed in 1863, dealing with defects of sight in brain disease, he pointed out the occurrence of two kinds of atrophy: one in which the nerve gradually whitened, the other in which whitening followed

certain acute changes, the latter being known as amaurosis. Emphasis was also laid on ophthalmoscopic examination in hemiplegia, and especially in seeking for evidence of Bright's disease, and in cases brought in comatose; and all the time he insisted on the need for preserving a philosophical balance of mind, so as to ensure that everything was seen in its true perspective. He set out, at length, his reasons for urging that ophthalmologists and alienists should do much work in common, for the evolution of movement and sensation could best be studied at an eye hospital. Amaurosis might be studied with too much intensity and at the same time with too little breadth. To the ophthalmologist it was a disease of such great importance, calling for particular action on his part, that he might underrate its significance as a symptom in general conditions of the system. It was when it occurred with other phenomena that the discovery of what it meant was most likely to be made. The ophthalmic surgeon could scarcely confine his thoughts to a single sense apparatus, however much his practice might be limited to the defects of that one. To the physician, defect of smell, though it might be less important, was of equal significance with defect of sight. Hemiplegia with its allies was the extra-ophthalmological symptom which chiefly deserved the consideration of ophthalmologists, because of the frequent occurrence of ocular or visual anomalies in association with it. Jackson regarded insanity as the very highest medical study.

As early as 1863, Hughlings Jackson wrote on the existence of optic neuritis without obvious defect of sight; but its acceptance in anything like a general way was only the result of constant insistence. He expressed the opinion that disease of the cerebellum, *per se*, does not produce blindness, neither does disease of the cerebrum, of itself, do so; but that tumor in either region did so by setting up optic neuritis, the result of local encephalitis. Lecturing on optic neuritis in 1871, Jackson said that the intracranial disease most often associated with double optic neuritis is a coarse one, a lump of something, an adventitious product; and further, that double optic neuritis did not point to any particular kind of coarse disease, only to some coarse disease. The condition scarcely ever occurred in chronic and general convulsive attacks, a condition of hemi-

plegia from local softening, etc.; and he pointed out that the optic neuritis was not a localizing sign. He begged his readers to remember the three following points: (1) that optic neuritis frequently exists when the patient can read the smallest type; (2) that in cases of adventitious products in the cranium, the ophthalmoscopic appearances vary greatly, also at different stages in the same case; (3) that the use of the ophthalmoscope should never be omitted when a patient has severe and continuous headache. Hughlings Jackson's ***Physician's Notes on Ophthalmology*** were a storehouse of interesting record, and in them he insisted that intracranial tumor might be present without optic neuritis, that optic neuritis night be observed and yet no tumor be found, and, as already mentioned, that optic neuritis did not necessarily result in blindness, though there was usually great danger of it leading to impairment of sight.

In his Annual Oration before the Medical Society of London, in 1877, he recognized the importance of the effects which refraction errors might produce. Thus, hypermetropia might cause symptoms simulating those of brain disease, such as headache and squinting; and observation of hypermetropic disks was of the utmost importance because of the close resemblance they bore to the inflamed disk associated with tumor. In this address Dr. Jackson proceeds to show the inseparable connection of motor activity with sensory activity in ideation. They showed that whilst the color—the secondary or dynamical quality—of an object is a sensory affair, its size and shape—its primary or statical quality—is a motor affair. In the light of this, ophthalmological facts became of inestimable value, showing that the estimation of the extension of objects was due to motor activity, and that activity of motor centres would suffice. He points out that optic atrophy is important in reference to examination with the ophthalmoscope; it often occurs in tabes dorsalis, and in general paralysis of the insane. It might occur with or without pupil changes, with or without pain, with or without ataxy; and it was not a necessary sign in tabes dorsalis. Retinal embolism, revealed by the ophthalmoscope, might be associated with cerebral embolism. The same instrument might render visible other tissue changes in the fundus, such as that

resulting from tubercle, syphilis, or Bright's disease, though it was to be noted that the ophthalmoscopic appearances of Bright's disease were often closely simulated by those occurring in intracranial tumor.

At a very interesting discussion which Dr. Jackson participated in, reported in the first volume of the *Ophthalmological Society's Transactions*, he states his belief that there is but one kind of optic neuritis due to intracranial disease; also that uniocular optic neuritis rarely occurs in cases of intracranial tumor. He considered it important to distinguish between the development of neuritis and consequent loss of vision from a foreign body, and loss of sight from a destructive lesion. Thus, hemiopia was usually the result of a destructive lesion, and, in itself, implied no change in the fundus. In the ordinary hemiopia from hemorrhage or clot, fundal changes did not occur.

With regard to the question of the mode of production of optic neuritis, against von Graefe's view that it was caused by raised intracranial pressure inducing venous congestion in the central vessels of the optic nerve, was the fact that a small tumor might cause intense optic neuritis, whereas a large hemorrhage might not be accompanied by any optic neuritis. He regarded the view of Benedict as the "most plausible," namely, that of reflex vasomotor action, inducing instability in the gray matter and influencing vessels in the optic nerves. A further plea for the early and systematic use of the ophthalmoscope arose from the fact that the best time for treatment of optic atrophy was early in its appearance.

Dr. Jackson's Bowman Lecture before the Ophthalmological Society, in 1885, was a philosophical treatise on Spencerian lines, but with a practical side. In it he showed the benefit of co-operation of specialized fields of research and knowledge; he also dealt with the complexity of nervous diseases, such as epileptic paroxysms.

Dr. Taylor said it was not easy to sum up briefly the outcome of Dr. Jackson's teaching, but, in addition to the points mentioned, he was much impressed by the educative effect of work carefully and energeticlly pursued at an ophthalmic hospital. Such work need not lead to a mere barren specialism or differentiation, nor had it done so, for, in addition to

definite increase of knowledge of eye conditions, it had led to discoveries which had been a means of investigation of several important diseases, and had brought about co-operation between neurologists and ophthalmic surgeons in the study and treatment of different morbid conditions.

In conclusion, Dr. Taylor expressed the hope that what he had said might open to some a new book, while to others it might be a reintroduction to an old acquaintance. To him, a study of these papers had been a source of much interest and great pleasure, and he had been anew impressed with the marvelous powers of one who was, to many of those present, a constant stimulus, and who was to him, in addition, a very dear friend.

LOCAL ANÆSTHESIA IN EXENTERATION AND ENUCLEATION OF THE EYEBALL WITH NOVOCAIN SOLUTION.

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Translated from the *Arch. f. Augen.*, Vol. LXXX., p. 23, 1915

THE following procedure is based upon an experience gathered in seventy cases. About ¾ of an hour before the operation we gave the patient a subcutaneous injection of scopomorphine. The dose varied from 4 to 7*mm* of a 1*cc* solution of the former and 0.01*g* of the latter, according to the constitution and age of the patient. This accomplished a certain amount of quiet on the part of even excitable patients.

Twenty-two to 25 and 17 and 5 minutes before the operation, a drop of a 5% cocaine solution was instilled into the conjunctival sac. Ten to fifteen minutes before the operation, 2½*cc* of a ½% novocain solution, with the addition of two drops adrenalin (1:1000) to 5*cc* of the fluid, was injected on the temporal and on the nasal side of the conjunctival sac behind the eyeball, thus producing complete painlessness during the operation. The nasal injection took place from a point directly above the lacrimal caruncle. The injection, at the temporal side, was at the external angle of the lids.

In the following cases the quantity of novocain was reduced from 0.5% to 0.15% and 0.2%, and preserving the period of thirteen to sixteen minutes before the operation, we obtained just as complete anæsthesia. In a certain number of cases this amount of novocain produced a satisfactory anæsthesia even when the morphine and scopomorphine were omitted. This procedure was, however, abandoned on acount of its some-

what uncertain and too brief action. The next change in our procedure consisted in the omission of the morphine injection. We then increased the amount of our novocain in the injection fluid to 0.25% (+2 drops of adrenalin 1:1000 to 5*cc* solution). The injections were practiced as just described. The amount of fluid injected was 2.5*cc* as before.

Hoffmann and Kochmann found that combining certain local anæsthetics with potassium sulphate, which is also an anæsthetic, causes an increase of the anæsthesia. We therefore changed our fluid to the following:

Novocain	0.0125
Potassium sulphate	0.02
Adrenalin (1:1000)	2 drops
Sodium chloride solution (0.9:100)	5.0

The injection of 2.5*cc* of this solution was made nasally and temporally after the conjunctiva had been rendered anæsthetic with cocaine. The preceding morphine injection was omitted. The operation which was undertaken after twelve to fifteen minutes was completely painless. It was not always possible to wait a definite length of time between the injection and the time of operation, though this is important when so small a quantity of anæsthetizing mixture is employed. We find, however, that the addition of potassium sulphate not only increased but also prolonged the anæsthetic action. We increased the strength of our novocain from 0.25% to 0.3%, keeping the total amount of injected fluid to 5*cc*.

After a time we reduced the amount of fluid injected from 2½ to 1½*cc*, keeping the strength of the novocain at 0.3%. The results were just as good and the operation was painless if it was not undertaken too soon—that is, never before twelve minutes after the retrobulbar injection. We therefore adopted the following as our routine method:

The subcutaneous injection of scopomorphine or of morphine was only employed in very excitable patients ¾ of an hour before the operation. The conjunctiva was anæsthetized by a drop of 5% cocaine solution twenty-five to twenty and twenty to fifteen minutes before the operation. Three to five minutes after the second drop of cocaine at least twelve minutes before the operation, 1½*cc* of 0.3% novocain solution with

a corresponding potassium sulphate addition was injected nasally and temporally from the conjunctival sac back of the eyeball. As for the procedure of the injection, the following has been our technic:

A straight platin-iridium needle 4*cm* long and about 0.4 to 0.6*mm* thick, with a syringe holding three to 5*cc*, was introduced through the outer part of the conjunctiva at the outer angle of the lids, with the head in an upright position, horizontally and parallel to the ocular axis, to a depth of 1*cm*. The syringe is then rotated so that the point of the needle is directed behind the eyeball along the prolongation of the ocular axis. The needle is then further introduced to a point 3 to 3½*cm* from the conjunctival wound. The point of the needle is then situated in the region of the ciliary ganglion, and very slowly 1½*cc* of this anæsthetic mixture is injected. The nasal injection is made by introducing the needle not directly above the caruncle but somewhat higher up, so that it passes either above or below the tendon of the superior oblique muscle and thus arrives at the region of the ciliary ganglion. Before injecting the anæsthetic fluid, it is advisable by taking off the syringe attachment to determine whether the point of the needle is situated in a blood-vessel. On both sides the needle is introduced slowly so that if an obstruction is encountered the needle is a little withdrawn and the direction is slightly altered without losing in general the direction just described. In most cases the injection is made easily and without pain, particularly if the conjunctiva is sufficiently anæsthetized. The injections are difficult in cases of injury as in war times where cicatricial bands are present in the orbit, though the result is satisfactory.

Another important factor to obtain a satisfactory anæsthesia is the position of the patient's head after the injections have been made. If the orbital tissues are loose and the head is bent over forward, the injection fluid may travel forward to the conjunctiva and cause chemosis. It is therefore important after the injection to have the patient hold his head back, whereby the action is exerted upon the region of the ciliary ganglion and the ciliary nerves. This is most easily accomplished by making the injection with the patient lying on his back.

It is necessary that the solution should always be quite fresh. This is on account of the adrenalin, for in order to get satisfactory results the adrenalin has to be perfectly preserved. Solutions of adrenalin are only fully active when they are colorless or slightly pink. Every novocain-adrenalin solution which shows a brown discoloration is only partly active. The tissues are not rendered anæmic, the absorption is not retarded, and the action of the novocain is not increased. In order to get a fresh solution, it is advisable to use a tablet consisting of 0.02*g* novocain + 0.00005*g* adrenalin in 6½*cc* of sodium-chloride potassium-sulphate solution ($7NaCl : 4K_2SO_4 :$ 1000 distilled water). This solution may be boiled for a brief period before use and the loss by evaporation can be made good by the addition of boiled distilled water. It is somewhat simpler to boil the salt potassium sulphate solution and dissolve the novocain tablet in this. This has the further advantage that the chemical agents are less likely to disintegrate. If we dissolve a tablet in a 5*cc* salt potassium solution we get a 0.4% solution, while a tablet dissolved in 4*cc* gives us 0.5% solution.

For ordinary operations this strength of the novocain solution, namely, 0.3%, is quite sufficient. If the operation be complicated, the solution may, however, be strengthened up to 0.4% to 0.5%. Higher concentrations than this are not necessary unless in addition to the enucleation a further operation on the orbit is necessary. If the operation is to be performed before the expiration of the necessary twelve minutes, it is wise not to increase the sum-total of the injected fluid 3*cc*, but to increase the proportion of novocain 0.3% to 0.5%. Anæsthesia may then be more promptly inaugurated and its duration lengthened. By increasing the strength of the novocain, it is also possible to reduce the amount of fluid injected down to 2 or 2½*cc*. It is quite unnecessary to make any other injections than these two deep ones just described.

We have never seen, either during or after the operation, any evil results for the patient from these injections; and in conclusion we believe that these very small quantities of novocain, especially when combined with potassium sulphate, and a few drops of adrenalin, give complete anæsthesia for operations on the eyeball. If for some reason or other the conditions are particularly difficult or the length of time of the operation

is longer than usual, the strength of the novocain can be increased. We are not in favor of either Seidel's or Gebb's method. These authors use novocain solutions of greater strength. Seidel uses a novocain solution 1 to 4%, while Gebb uses a much larger amount of fluid for the injection, namely, 10*cc*.

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EXAMINATION OF THE VISUAL FIELD IN GLAUCOMA AND ITS VALUE FOR DIFFERENTIAL DIAGNOSIS.

By Prof. W. LÖHLEIN, Greifswald.

Translated from the *Arch. f. Augenh'lkde*, Vol. LXXVI., Nos. 3 and 4, 1914.

(With five illustrations in text.)

SATTLER and Fleischer have recently drawn attention to the practical and theoretical importance of the examination of changes in the visual field in glaucoma, according to the methods of Bjerrum and his pupil Ronne. It is well known that Priestley Smith has for some years recommended a similar method of examination. These methods are well enough understood. It suffices to state that Bjerrum found changes in the visual field in glaucoma in the form of an arcuate or annular scotoma starting from the blind spot and surrounding the point of fixation when the field was examined by very small objects, and a consequently much smaller visual angle. There have been references in literature to paracentral scotomas as rare conditions in glaucoma (Sachs, Schnabel, Bass, and others). Bjerrum was able to show by means of his method that this condition occurred in a large percentage of visual fields in glaucoma. This author believed that the arcuate scotomas always starting from the blind spot depended upon the functional destruction of certain bundles of nerve fibers which, passing from the upper or the lower margin of the papilla, described an arc about the macula. The site of the lesion seemed to be the margin of the excavation. It remained obscure why these two bundles of nerve fibers which are so far apart at the disk should be the earliest affected by the increased intraocular pressure.

Ronne was able to add another proof to this theory of Bjerrum's. He thought if the lesion was due to a defect in the nerve bundles from the anatomical condition of the fibers in the retina, the lesion must show itself at still another point,

namely, at the nasal horizontal meridian of the visual field. It seemed probable that the limiting line which runs in the temporal half of the retina and divides the nerve fibers which pass above and below the macula, must show the separation between a healthy and a damaged bundle, with the result that in this part of the visual field the limits of the visual defect must run for a part along the horizontal meridian.

Ronne was able to demonstrate the presence of this nasal step in the temporal half of the visual field in the majority of cases of glaucoma. This confirms Bjerrum's view, and it is now generally accepted that this frequent and peculiar visual defect in glaucoma represents the functional destruction of certain bundles of nerve fibers. The value of these observations was appreciated in England long before it was in Germany. Sattler, Jr., found in many cases of primary glaucoma that the Bjerrum scotoma starting from the blind spot was present nearly uniformly, and the nasal step of Ronne occurred in nine out of twenty-six cases. This author believes that this is a very important and characteristic symptom in diagnosis.

Fleischer has expressed himself similarly, and believes that it is possible by means of the Bjerrum method to make an early and differential diagnosis where the ophthalmoscopic and other methods of examination are still indefinite. He believes that a normal blind spot practically excludes glaucoma.

It has been my impression that these two authors have gone too far in advocating the value of this examination in the differential diagnosis of glaucoma. I have been able to confirm the statements of Bjerrum and Ronne that in a high percentage of cases of primary glaucoma the arcuate scotoma or the nasal step or both are frequently present, though I do not think that they have the value for early and differential diagnosis that Sattler and Fleischer maintain.

1. There are cases in which the visual field symptoms of Bjerrum and Ronne are absent. Bjerrum and Ronne have modified their opinion by stating that in every case of glaucoma at a certain stage this characteristic defect in the visual field can be demonstrated. As has just been stated, some authors (Priestley Smith and Fleischer) state that the absence of these symptoms excludes glaucoma, and this I want particularly to contradict. The following is the report of a

case of undoubted chronic glaucoma, which was observed for many years in our clinic and was repeatedly examined with very small objects (1*mm*) without showing any evidence of an arcuate scotoma or a nasal step. This was a case of juvenile glaucoma, a patient who now is 33 years of age, and whom we have been following for seven years. He has a hypermetropia of 5 D. The eyes otherwise show no abnormality except shallow anterior chambers. In the first year the patient suffered from prodromal symptoms, then after exposure to cold, alcoholic excesses or excitement, frequent typical glaucoma attacks developed and would lead to an intraocular pressure of 65 (Schiötz), with cloudiness of the cornea, etc. These symptoms would always pass away in the course of a few hours of themselves, or after the use of miotics. Notwithstanding the frequent repetition of the attacks, the vision and the ophthalmoscopic finding and the visual field have remained normal. The absence of an excavation of the disk may be the cause that the local damage to the nerve fibers which gives rise to the symptoms of Bjerrum and Ronne was absent. On the other hand, the case controverts the view that the absence of these visual field defects indicates no glaucoma.

2. Do the symptoms of Bjerrum and Ronne occur in cases which are not glaucomatous? There can be no question that in non-glaucomatous diseases we have visual fields which resemble those described by Bjerrum and Ronne, both in closure of a branch of the retinal arteries and in various diseases of the optic nerve. I want to mention first of all a case of fracture of the base of the skull after a fall, in which the right optic nerve was compressed and permanent damage was done both to central and peripheric vision. In this case there was a nearly complete destruction of the upper half of the visual field by a relative scotoma starting from the blind spot, which passed below the point of fixation, showing that a paramacular bundle must have been affected (visual field 1).

Another striking visual field defect occurred in a case of partial neuritic atrophy of the optic nerve (visual field 2) which resembled the conditions found in glaucoma. In this case there was a moderate concentric contraction and a short arcuate absolute glaucoma, which began at the blind spot and

showed a pronounced nasal step from 10° to 30°. This is unquestionably a visual field typical for glaucoma.

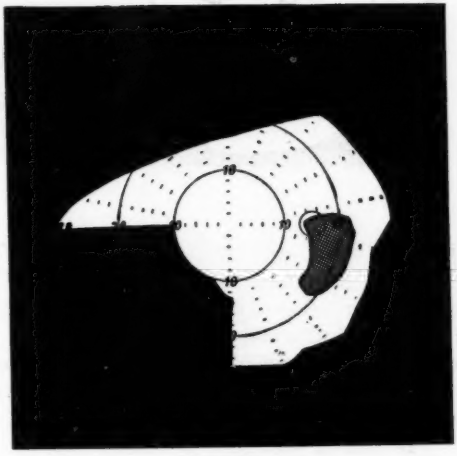
In a third case, a patient with bilateral choked disk, there was a distinct arcuate enlargement of the absolute scotoma at the blind spot, continuous with an annular defect which passed into an absolute scotoma in the nasal periphery. A similar observation has recently been made by von Szily in a patient with cerebral choked disk and a gradual development of an annular scotoma. These visual defects can easily be regarded as due to destruction of certain nerve fibers which give the characteristic symptoms of Bjerrum and Ronne, but the differential diagnoses of these conditions with glaucoma are not necessary.

The condition of genuine atrophy of the optic nerve, however, is a very much more important one, because this, as is well known, frequently is confounded with chronic glaucoma. In this disease Ronne, in 1909, showed that these characteristic visual field defects may occur, though not so frequently as in glaucoma. He has, moreover, shown that the relatively frequent occurrence of the nasal step in tabetic atrophy is the true reason for the sector-like defect in the field so frequently observed in this disease. Ronne himself realizes that these changes in the visual field are not pathognomonic of glaucoma, though the importance of these visual defects for the diagnosis of glaucoma seemed to have been exaggerated. Ronne believes that the reason Langenbeck did not find the nasal step in tabetic atrophy was due to the possibility that careful search for this symptom was not made in the earlier field examinations.

As variations in the field occur in different diseases of the optic nerve which resemble those found in glaucoma, and particularly in that disease which is most frequently confounded with primary glaucoma, the differential value of this visual field defect for glaucoma of course loses its force. Without wishing to question the diagnosis of glaucoma in Cases 22 and 26 of the Sattler statistics, there seemed some question in my mind whether the arcuate scotoma or the nasal step were sufficient to make a diagnosis of glaucoma with normal tension, a shallow and only partial excavation. As these conditions are not unknown in the various forms of atrophy, reliance upon the above-mentioned visual-field defect may

lead to an error in diagnosis. I am therefore inclined to agree

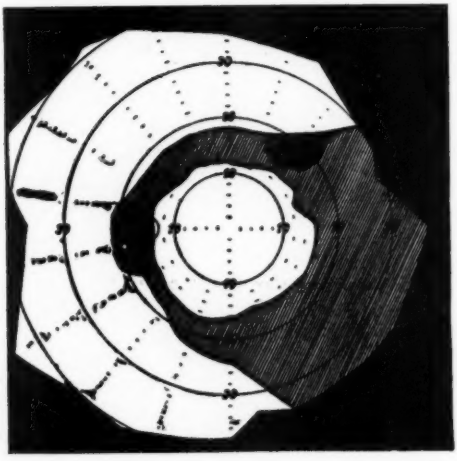
VISUAL FIELD 1.



VISUAL FIELD 2.

with Schmidt-Rimpler in denying the diagnostic value of the symptoms of Bjerrum and Ronne.

On the other hand, the systematic investigations of the various diseases with Bjerrum's method have given us important and new information. I need only refer to the recent article of Ronne on the occurrence of defects in the nerve fibers in the visual field. There seems no question but that these visual fields described by Bjerrum and Ronne are signs of distinct defects in the nerve fibers, and at first thought they could be regarded as additional proof for the correctness of Schnabel's theory of glaucoma. For Schnabel came to his



VISUAL FIELD 3.

theory from the observation of paracentral scotomas in five cases of primary glaucoma. This reasoning is easily controverted by the observation of exactly similar nerve-fiber defects in a case of so-called secondary glaucoma.

The following are the fields in the case of a patient who suffered from a severe secondary glaucoma following iritis, with posterior synechia recurring for eight years (field 4. R. and L.). The field of the right eye shows type of horizontal hemianopsia (de Schweinitz, Ronne), which is a subdivision of the nasal step. The left eye shows an arcuate scotoma starting from the blind spot, which passes above and below into a large peripheric scotoma combined with a distinct nasal step.

In these cases of secondary glaucoma there is no possibility of

VISUAL FIELD 4. RIGHT.

VISUAL FIELD 4. LEFT.

an independent optic-nerve lesion. The similarity of the fields in these cases with those found in so-called primary glaucoma

shows that this field defect can not be the result of a primary optic-nerve lesion, but can occur in all glaucomatous processes, and presumably is due to increased intraocular pressure.

It is difficult to explain why the increased pressure in a glaucomatous eye should select particularly the upper and the lower bundle of nerve fibers for its pressure. Possibly the positive venous pulsation in a glaucomatous eye may be responsible, and that the blood-vessels which are in contact with these particular bundles produce a damage just in this position. Furthermore, it must be considered that just as the blood-vessels in the glaucomatous disk are apt to be displaced nasally, the nerve fibers may also be pushed to one side and injured by this action.

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DERSELBE. "Über das Vorkommen von Nervenfaserdefekten im Gesichtsfeld und besonders über den nasalen Gesichtsfeldsprung." *Arch. f. Augenheilk.*, Bd. lxxiv., 1913. Dort sind auch weitere Arbeiten Ronne's zu finden.

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REPORT OF THE TRANSACTIONS OF THE SECTION ON OPHTHALMOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

By GEORGE H. BELL, M.D., Secretary.

MEETING OF MAY 17, 1915. H. H. TYSON, M.D., CHAIRMAN.

Dr. A. DUANE showed a girl, four years old, upon whom he had done a tenotomy of the **inferior oblique for torticollis.** A full report will be found in this issue.

DISCUSSION: In discussing Dr. Duane's case, Dr. J. E. Weeks said he thought torticollis occasioned by the condition of the eye is extremely rare. Had seen only one case before this. This was cured by operation on the superior rectus muscle.

Dr. Weeks congratulated Dr. Duane upon the result, as he considered it most excellent.

Dr. JOHNSON spoke of a case he had twenty-five years ago, where the patient carried his head to one side. He made a tenotomy of the superior rectus muscle which cured the patient.

Dr. H. H. TYSON related the history of a case he had examined at the Vanderbilt Clinic with marked torticollis, which had been referred from the neurological department. Case was that of a man fifty years of age, who had suffered from the condition for many years, and not finding any cure, as a last resort he was referred for examination as to any possible errors of refraction in his eyes. His visual acuity was found to be normal; but a high degree of hyperphoria was discovered. Upon prescribing strong prisms, base up on one eye and down on the other, he obtained great relief and was enabled to carry his head quite erect, with the disappearance of most of the

torticollis. In other cases of slight tilting of head toward one shoulder, relief has been obtained by prescribing prisms base up in combination with refractive correction. Dr. Tyson had the privilege of witnessing the operation by Dr. Duane, and complimented him upon the excellent result obtained. Although a rather difficult operation, the easy manner in which it was performed showed the thorough knowledge of the anatomy of the region possessed by the operator.

Dr. WEEKS thinks the cases of torticollis that are cured by the use of prisms are cases of "Head Tilting." Head tilting is seen frequently, and is corrected by the proper use of prisms.

Dr. DUANE said that if a torticollis was allowed to remain a long time secondary changes might take place which would render the complete removal of the deformity difficult, even though the cause were abolished. This consideration had induced him to operate on the child while it was still young. In answer to Dr. Weeks, he said that while torticollis from congenital deviations of the eyes was rare, it was not excessively so, and the congenital deviations themselves were quite frequent. Another case of marked torticollis that he had seen was caused by a paresis of the inferior rectus. Here advancement of the inferior rectus, followed some days later by tenotomy of the superior rectus, relieved the torticollis and almost completely abolished a vertical deviation of over 40 deg.

Dr. F. W. SHINE showed a case of **abducens paralysis** complicating **ethmoiditis.**

Patient woman, age 40. First seen August 1, 1908. Attack of frontal sinusitis, left side. Had had a mild ptosis for a number of years previous. Macula of cornea (central). Vision $\frac{20}{200}$. Sinus cleared up in two weeks. Seen again in 1912 with similar attack of frontal sinusitis, which cleared up after removal of anterior tip of middle turbinate (left side). April 4, 1915, came in with another attack of sinusitis, ethmoiditis, and sphenoiditis, and a complete paralysis of left external rectus, left eye converging 35 deg. A complete exenteration of left ethmoid and sphenoid was done by Dr. Atkins on April 6th, with complete restoration of mobility outward one week after operation. No change in ptosis. Wassermann negative.

Dr. H. H. TYSON presented a case of **methyl alcohol amblyopia,** with the following history:

Case, negro, male, age 30 years, who drank some "gin" one evening last October. On the following morning he experienced headache, vertigo, nausea, vomiting, chills, cold sweats, and blurred vision, since which time he has had poor vision. V. O. D.=0. V. O. S.=movements of hand; and strange to relate he can tell time by watch at 16", holding it slightly toward nasal side of fixation of left eye, thus indicating that he possesses only a small island of vision, a bundle of fibers having escaped atrophy located slightly to the temporal side of the macula in his left eye. Fundi show atrophy of optic nerve, with evidence of previous perivasculitis; contracted arteries, some of the terminal arteries being obliterated. No sinus disease nor specific history. Negative Wassermann and von Pirquet. He had been treated at one of the eye clinics with salvarsan and specific remedies, notwithstanding the negative Wassermann and non-specific history, and what is considered a typical clinical history and a picture of methyl alcohol toxæmia.

Dr. GEORGE H. BELL presented a case of **abscess of cornea** in a man 60 years of age. He has been under treatment for about six weeks.

There is a bluish exudate now in the deep layers of the cornea, which when he was first seen at the hospital had a yellow tinge. He had marked ciliary injection and some iritis. There has been no ulceration of the cornea, as the epithelium of the cornea has not been disturbed. This mass in the cornea has been quietly absorbing, and now presents a serrated edge on its upper border. The ciliary injection and the iritis have subsided. The Wassermann and von Pirquet both were negative. This is an interesting case, as an abscess without infection through the epithelium of the cornea is very unusual. One oculist who saw this case thought it was sclerosing keratitis. The patient at no time had any scleritis and sclerosing keratitis is an accompanying symptom of deep scleritis.

Dr. C. E. MCDANALD showed a case of **congenital pigmentation of the retina** in a man 32 years of age, with normal vision.

Drs. NOGUCHI and MARTIN COHEN read a paper on **bacteriological and clinical studies of an epidemic of Koch-Weeks**

bacillus conjunctivitis associated with cell inclusion conjunctivitis.

This paper will be published in full in these ARCHIVES.

DISCUSSION: Dr. JOHN E. WEEKS said that he was glad to hear the results of Drs. Noguchi and Cohen's labors. His study of acute catarrhal conjunctivitis was done in 1886 and the year following. He examined at that time over 5000 cases and made a great many cultures.

Dr. Weeks regards granular conjunctivitis as an infection entirely separate from Koch-Weeks bacillus. He has studied many cases carefully, but has never found granular conjunctivitis with Koch-Weeks bacillus. He agreed with Dr. Cohen in reference to the pneumococcus and Koch-Weeks bacillus, except that the Koch-Weeks is a little more severe.

Dr. NOGUCHI, in closing the discussion, said: I wish to state that numerous chain forms were seen in fluid cultures. The reason why there were apparently genuine Koch-Weeks bacilli in a few normal conjunctivæ may be explained by the fact that these persons were in the same ward where the present outbreak of the epidemic had taken place. It must then be assumed that these inmates were in frequent contact with the other cases, and that the organisms found were of attenuated virulence, or else that the persons carrying them with impunity were unusually refractory to the infection. Such cases may eventually constitute "carriers," as Dr. Cohen is inclined to think. In regard to the possibility of causing a typical Koch-Weeks conjunctivitis by using the testicular material in which numerous bacilli may be found, and probably in increased virulence for this animal, I may mention that I had this already in view when I undertook the experimental Koch-Weeks orchitis in the rabbit, and tried to infect the conjunctiva not only of rabbits but also of monkeys with such material, although with invariably negative results. It was also found that the rabbit is too susceptible to the strains of Koch-Weeks bacilli in our possession to allow of successive intratesticular passages beyond a few generations; the animals soon succumbed to the septicæmia. Concerning the remarks of Dr. Williams, I may say that the question of the strict hæmoglobinophilic nature of the Koch-Weeks bacillus and the bacillus influenzæ may find its solution in the fact that,

although originally held to be non-hæmoglobinophilic by its discoverer, the cultural conditions available at that period might be accountable for this discrepancy; for, as Dr. Williams herself found, these hæmoglobinophilic organisms can thrive on blood-free media when introduced together with certain other bacteria, and it was in an impure culture that the organism was first isolated by Dr. Weeks. I agree with Dr. Williams' statement that morphological features of different strains bear no constant relationship to their pathogenicity; yet it was remarkable in the present epidemic to find that different strains when isolated retained their original characteristics in pure cultures for many months. They do undergo certain peculiar changes in their appearance when kept on the same media for many days, but even there the degree of breaking up into granules or into other involution forms is quite characteristic of each type. The thin type has more minute granules than the medium and coarse types. In order not to overlook the effect of age upon the morphology of the organisms, smears from twelve strains were made every twenty-four hours during fourteen days, and subjected to microscopical examination. In this study three different sets of culture media were employed, namely: neutral, alkaline (N/40), and acid (N/40) reactions. Nothing remarkable happened with any of them, except that the organisms grew less luxuriantly on the acid media. After careful comparative studies of the eye strains of the hæmoglobinophilic organisms and several strains of B. influenza as derived from cases of meningitis and pneumonia (courtesy of Dr. Wollstein), I am strongly inclined to think that, morphologically at least, they are distinctive; probably not every strain, but the majority at least. The Koch-Weeks bacillus as isolated from the present epidemic is considerably smaller than the average influenza bacillus strains. Serological studies may or may not aid to differentiate the two groups, but this matter will shortly be taken up. With regard to the suggestion whether the failure of isolating the hæmoglobinophilic bacilli from our so-called uncomplicated "inclusion" cases might not be due to some defective technic, I wish to reply that we have made particular efforts to free ourselves from this source of error. In all such cases we have repeatedly taken cultures for the whole course of the disease

in each case. The culture media employed for this class of cases were blood agar, blood broth, tissue ascitic fluid bouillon, and sometimes plain tissue bouillon. These culture media were inoculated with a suspension of conjunctivæ scrapings in ascitic fluid within one hour after the removal of the material from the patients. Except in the case of the blood agar, subcultures were made from these fluid media on fresh blood agar as well as on tissue ascitic agar (deep layer). The results were completely negative. It may be mentioned that the method of resorting to enriching the bacilli by the above procedure will always enable one to detect the presence of the Koch-Weeks or any other hæmoglobinophilic bacilli, even in small quantities. It may also be mentioned that in the majority of instances the contaminating organisms were rather few, and it is out of the question that these organisms overgrew the hæmoglobinophilic bacilli. This could not happen in view of the fact that we find almost no organisms in a blood agar culture which has been inoculated with the conjunctival scrap ngs rich in "inclusion bodies.' While leaving open the question of the po sibility of "inclusion" formation occurring through the ingestion o the hæmoglobinophilic bacilli or gonococci by the epithelia, I nevertheless maintain that there exist pure uncomplicated cases of conjunctivitis due to the "Prowazek bodies."

Dr. Noguchi demonstrated microscopical preparations showing (1) the "elementary granules," (2) the "initial bodies," in smears from uncomplicated "inclusion" conjunctivitis, and (3) the "inclusion bodies," in a smear taken from the conjunctiva of a baboon which was infected with the scrapings of conjunctivæ of "inclusion" cases. In the last of the series a section was shown of experimental Koch-Weeks bacillary orchitis in rabbits, in which a few clumps of ill-defined bacilli were seen in the lumen of the tubules.

QUARTERLY REVIEW OF THE PROGRESS OF OPHTHALMOLOGY.

By H. KOELLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMELL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER, Strassburg; K. WESSELY, Würzburg; and M. WOLFRUM, Leipsic, with the Assistance of Drs. ALLING, New Haven; CALDERARO, Rome; CAUSÉ, Mayence; CURRAN, Kansas City; DANIS, Brussels; GILBERT, Munich; GROENHOLM, Helsingfors; v. POPPEN Petrograd; TREUTLER, Dresden; and VISSER, Amsterdam.

Edited by MATTHIAS LANCKTON FOSTER, M.D., F.A.C.S.
New Rochelle, N. Y.

FIRST QUARTER, 1915.

(Continued from Vol. XLIV., p. 700.)

XVI.—CHOROID.

73. MOORE. **Four cases of melanoma of the choroid, with pathological examination of one case; and one case of unusual chronicity after the dissemination of melanotic sarcoma had occurred.** *Royal London Ophthalmic Hospital Reports*, November, 1914.

MOORE (73, **Four cases of melanoma of the choroid, with pathological examination of one case; and one case of unusual chronicity, after the dissemination of melanotic sarcoma had occurred**) in reporting these cases gives the following points for differentiation of benign melanomata from small sarcomata:

1. A uniform homogeneous slate-gray color of the tumor as seen by the ophthalmoscope.
2. A quite definite but somewhat feathered edge.
3. An absence of any pigmentary disturbance around the growth.
4. An absence of all symptoms of retinal involvement.

CURRAN.

XVII.—SYMPATHETIC OPHTHALMIA.

74. KEUTEL. **Is there a sympathetic amblyopia?** *Klin. Monatsbl. f. Augenheilkunde*, February–March, 1915, p. 251.

75. MELLER. **Necrosis in sympathetic inflammation.** *Arch. f. Ophthalm.*, lxxxix., 2, p. 248.

76. NORMAN, ALFRED C. **A case of sympathetic ophthalmitis treated with tuberculin. Recovery.** *Ophthalmoscope*, April, 1915.

NORMAN'S (76, **A case of sympathetic ophthalmitis treated with tuberculin. Recovery**) case began as phlyctenular keratitis followed by a large sloughing ulcer in the left cornea. This became quiet under treatment. The right eye was then free from inflammation but shortly afterwards it showed signs of sympathetic ophthalmitis, which became worse during the next month. The left eye was then removed. The ophthalmitis became so bad that recovery was despaired of. Tuberculin was given weekly and the eye began to improve rapidly, and a year afterwards the vision remains at $\frac{6}{18}$.

CURRAN.

Some writers have taken the ground that there is a relation between sympathetic ophthalmia and tuberculosis. One of the weightiest grounds against this theory is the absence of caseation, yet it is conceivable that any masses of tissue may become necrotic when the blood supply does not keep step with the growth. MELLER (75, **Necrosis in sympathetic inflammation**) observed necrosis in two cases of sympathetic ophthalmia and sketched the exact histological conditions. While tuberculosis commonly has a principal focus, there is in sympathetic ophthalmia a uniform spread of the condition over the uvea. The limitation to the choroid was clearly to be perceived, and though the iris and ciliary body form a large tumorlike mass, it differs from that of tuberculosis in which even the smallest foci exhibit a tendency to break through the pigment layer. The nodules also appear in all of the layers of the choroid, preferably in the choriocapillaris, in contrast to the condition in sympathetic ophthalmia. The sclera is eroded and softened, finally perforated in tuberculosis, while in the other disease there is in bad cases a slight erosion through the extension outward along the tracks of the nerves and blood-vessels. Although nodules having the typical structure of tubercles are found frequently in sympathetic ophthalmia, yet

there are large areas where the picture is altogether different. The necrosis differs in extent and arrangement from that of tuberculosis, as it does not appear in little nodules, but in the tissue itself, and only in the worst cases. Another point is that the conglobate tuberculosis of the eye is almost always monolateral, which naturally is not the case with sympathetic ophthalmia.

KEUTEL (74, **Sympathetic amblyopia**) has collated the literature on the subject and reviews it critically. Doubt has often been expressed as to the existence of this visual disturbance, which is only moderate as a rule. The first eye is always painful and irritated, but has not necessarily been injured. The disturbance is dependent on the irritation of the first eye and can be obviated usually by enucleation. It is now acknowledged that the results of tests of vision of irritated eyes fluctuate, so that in most cases we have a mechanical hindrance to the vision. Hysteria cannot be excluded in the cases with concomitant contraction of the visual field. Even the cases that have been reported most lately can be explained as cases of changes in the optic nerve, hysteria, or simulation. On the whole sympathetic amblyopia does not appear to exist as an independent clinical picture.

XVIII.—GLAUCOMA.

77. ALEXANDER, G. F. **A case of malignant glaucoma successfully treated by repression of the lens.** *Ophthalmic Review*, July, 1914.

78. DEUTSCHMANN. **Sclerectomy and Elliot's trephining, together with remarks on the genesis of choked disk.** *Beitraege z. Augenh.*, lxxxix., p. 659.

79. FORONI. **Sclerectomy ab externo.** *Arch. f. Ophth.*, lxxxix., 2, p. 393.

80. LUNDSGAARD. **Elliot's operation for glaucoma.** *Klin. Monatsbl. f. Augenheilkunde*, February–March, 1915, p. 209.

81. MCGUIRE, H. H. **Hydrophthalmos following trauma. Report of a case.** *Ophthalmic Record*, March, 1915.

82. MCRAE, ALEXANDER. **Glaucoma and the blood pressure.** *Ophthalmoscope*, April, 1915.

83. SMITH, PRIESTLEY. **On the limitations of the tonometer.** *Ibid.*, March, 1915.

PRIESTLEY SMITH (83, **On the limitations of the tonometer**) in a scientific paper on the use of the tonometer, while acknowl-

edging that it is the most accurate method we have of ascertaining the intraocular pressure, points out its limitations, sources of error, and by a series of ingenious experiments attempts to arrive at the possible amount of error. It is well known that the size of the eye, its shape and structure are factors to be considered in attempting to arrive at the intraocular pressure by any method which depends upon the impressibility of the eye. Smith did his experiments on dead eyes with a manometer in the vitreous and compared the results with the tonometer readings. He considers that the readings and not their supposed equivalents should be recorded. This excellent paper should be studied in the original text as a digest would not do it full justice in view of the present use of the tonometer and the general acceptation of its readings as representing the true intraocular tension notwithstanding that Parsons also pointed out some years ago the fact that intraocular pressure should not be arrived at by methods which depended on impressibility of the eyeball.

CURRAN.

ALEXANDER (77, **A case of malignant glaucoma successfully treated by repression of the lens**) reports a case in which he did repression of the lens (Weber's operation) with satisfactory results. The anterior chamber is reëstablished and the tension remains a low normal after four months' duration since the operation.

He considers this operation should be done immediately in cases where the lens is thrust forward and the tension high, following iridectomy. The cause of the displacement in his opinion is the stretching of the zonule by repeated attacks of high pressure behind the lens.

CURRAN.

DEUTSCHMANN (78, **Sclerectomy and trephining**) performs sclerectomy by introducing a keratome beneath a flap of conjunctiva that has been dissected up, 3 or 4*mm* behind the margin of the cornea into the anterior chamber, and then by tilting it to the right and left forms a flap of the sclera, which is excised, leaving an aperture of two or three square millimeters. The iris is excised but rarely. Out of forty-eight cases operated on in this way tension was reduced satisfactorily in eleven, not in thirty-one. Vision and the visual field were improved in

10.4%, remained the same in 60.4%, and became worse in 27%. Since 1912 he has performed Elliot's operation on 163 cases. The result was good in 55.2%, not good in 31.9%, unknown in the balance. The dropping of the button of sclera into the anterior chamber is of no importance. Cataracts formed later in seven cases. Posterior synechiæ appeared almost regularly, so that atropine was used. An acute attack of glaucoma appeared in the eye operated on within twenty-four to thirty-six hours in three cases, later in two. The œdematous scar forming a cushion is the most common in cases treated successfully, while in a moderate number there was an open perforation without a visible cushion, or an invisible perforation. In the mishaps the cushion was most often absent, and nothing could be seen of the place of operation in 63.4%. Yet in spite of the cushion the tension may remain high. Two late infections were observed and one inflammation of the flap. Two eyes were removed later. Three cases of hemorrhagic glaucoma were not improved. The results were unsatisfactory in four cases of buphthalmos, the eyes remained soft in two. In general the results with iridectomy were better than those without, and far better than those obtained by sclerectomy.

LUNDSGAARD (80, **Elliot's operation**) trephined forty eyes for glaucoma, reduced the tension in thirty-two, produced no effect on the tension in six, and lost two through atrophy. The cushion was present in all but one of his good results. The size of the trephine was 1.5 and *2mm;* he prefers the latter. Iridectomy was performed in rather more than half of the cases. The cases in which the tension was lowered always showed an improvement in their function. He had two cases of late infection.

FORONI (79, **Sclerectomy ab externo**) describes a modification of Lagrange's operation. He makes a conjunctival flap with a rather narrow base at the equator, so as to form a sort of pocket extending to the margin of the cornea. Then he makes two parallel incisions 5*mm* long and 1*mm* apart in the sclera with a Graefe knife, opens the anterior chamber carefully, abscises the marginal portion of iris that usually prolapses, and after he has sufficiently laid bare the flap of sclera between the two incisions he excises it so as to leave a right-

angled aperture. The conjunctival flap is now sutured. The operation is easy, and the results are said to be very good.

McGUIRE's (81, **Hydrophthalmos following trauma**) patient, when four years old, received a perforating wound of the cornea and traumatic cataract followed which later absorbed. The corneal diameters gradually increased and in spite of iridectomy and trephining the whole eye became much enlarged, thinned, and glaucomatous. As the eye was painful it was removed three and a half years after the injury.

ALLING.

McRAE (82, **Glaucoma and the blood pressure**), after reviewing the important literature on this subject, tabulates the results of twenty cases of primary glaucoma, which he compared with twenty control cases. He considers his observations on these cases neither for nor against the theory that the average blood pressure is high in glaucoma, though the figures tend to oppose it.

He has also experimented on three young patients, giving them exercise to increase the blood pressure and then taking the intraocular tension. In only one case the intraocular tension was raised *1mm* Hg. and, on repeating the experiment on the same patient a week later, the opposite effect was noticed—the tension being diminished by *1mm* Hg. In another patient the tension was unchanged, and in the third patient it was lower than before the exercise, notwithstanding that in each case the blood pressure was raised. He concludes that there is an exaggerated importance given the blood pressure in maintaining intraocular tension, and that osmosis plays a greater part.

CURRAN.

XIX.—RETINA.

84. AXENFELD, KUEPFERLE, and WIEDERSHEIM. **Glioma of the retina and intraocular X-ray treatment.** *Klin. Monatsbl. f. Augenheilk.*, January, 1915, p. 61.

85. BATTEN. **Double detachment of the retina in a boy with albuminuria.** *Proceedings Royal Society of Medicine*, section Ophthalmology, July, 1914.

86. BERRY. **The causes and symptomatology of impaired retinal activity.** *Lancet*, October 25, 1913.

87. COATS, GEORGE. **A peculiar case of retinal atrophy in the dog.** *Ophthalmoscope*, January, 1915.

88. CURTIN, T. H. **A case of retinal detachment.** *Ophth. Record*, February, 1915.

89. EASON. **A case of spontaneous recovery from detachment of the retina.** *Lancet*, January 2, 1915.

90. FISHER. **Drawing of semilunar retinal hemorrhages (so-called subhyaloid hemorrhages).** *Ophthalmoscope*, April, 1915.

91. GUZMANN. **Histology of gliosis retinæ diffusa.** *Arch. f. Ophthalm.*, lxxxix., p. 323.

92. HIGGINS. **Cases of recovery from detachment of the retina.** *Lancet*, September 12, 1914.

93. JAMES. **A case of retinal detachment in a myope treated with rest in bed, retaining useful vision for the past two years.** *Ophthalmic Review*, January, 1915.

94. VAN DER HOEVE, J. **Retinochoroiditis juxtapapillaris.** *Nederl. Tijdschr. voor Geneesk.*, 1914, ii., No. 6.

95. ZENTMAYER, WM. **A case of complete sclerosis of the retinal circulation.** *Annals of Ophthalmology*, January, 1915.

VAN DER HOEVE (94, **Retinochoroiditis juxtapapillaris**) gives the clinical history of a recurrent case of this nature. The patient was otherwise healthy. In addition to the focus at the margin of the papilla there was a smaller one in the region of the macula. The typical sector-shaped defect in the visual field, lying between the blind spot and the lower margin, was absolute and permanent. The patches of infiltration retrogressed after two months to a slightly pigmented atrophic spot at the margin of the papilla and a slight pigmentation in the macula. The vision improved to about $\frac{1}{2}$. In the right eye there was nothing to be seen of a former attack. The still existing relative defect in the field was almost symmetrical with that in the left eye. The writer thinks that the choroidal changes do not appertain to the nature of the disease, which originates in the retinal vessels, contrasting with retinochoroiditis disseminata. The disease of the layer of nerve fibers is the essential part of the clinical picture.

VISSER.

BATTEN'S (85, **Double detachment of the retina in a boy with albuminuria**) case was a hypermetrope of fourteen years with albuminuria due to chronic nephritis. Batten points out that a number of cases of detachment and albuminuria have been reported and a few with cyclic albuminuria, and he considers that there is no doubt as to their association.

CURRAN.

CURTIN (88, **Retinal detachment**) operated upon a case of non-traumatic detachment involving the lower and outer part of the retina by removing a button of sclera with the trephine. There was no improvement and ten days later twenty-five minims of clear fluid were aspirated through the opening. The retina was seen by the ophthalmoscope to be in place immediately afterward and remained so at the last examination two months later. Very little reaction followed either operation.

ALLING.

EASON (89, **A case of spontaneous recovery from detachment of the retina**) reports a case of reattachment of the retina in a myope with the vision and field restored. He remarks that in detachment the vision only remains in abeyance to be restored on coming in contact with the pigment epithelium once more. It is not wholly a matter of nutrition for the detached retina is well nourished for a long time after detachment.

CURRAN.

FISHER (90, **Drawing of semilunar retinal hemorrhages**) suggests that as there is no agreement as to the position of the blood in these cases, it is better to substitute the term "semilunar" for "subhyaloid." He reports a case of a patient of forty-five years with vessels healthy and no increase in arterial tension in which he considers that the hemorrhages were due to venous obstruction of the central vein. The blood finds its way very rapidly into the vitreous.

CURRAN.

HIGGINS (92, **Cases of recovery from detachment of the retina**) reports three cases of recovery from detached retina—the only three he has ever seen in his experience. He considers the best treatment to be rest in horizontal position for weeks and elimination of fluids, such as sweating, purgation, absorbents, and abstinence from fluids as far as possible. He considers operative treatment worse than useless.

CURRAN.

JAMES'S (93, **A case of retinal detachment in a myope treated with rest in bed, retaining useful vision for the past two years**) patient was kept in bed for six weeks and conjunctival injections of normal saline were given twice a week. The retina

became reattached and vision went up to $\frac{6}{60}$ and six months later to $\frac{6}{12}$. He is convinced that the treatment had no part in the cure. CURRAN.

GUZMANN (91, **Histology of gliosis retinæ diffusa**) had the opportunity to examine an eye pathologically in which the diagnosis of this disease had been made five years before. Enucleation had been performed because of secondary glaucoma. The most striking feature seemed to be that the proliferations perforated the lamina vitrea and the choriocapillaris in certain places, and had transformed the choroidal tissue into a glial mass, which showed the tumorlike character of the disease.

AXENFELD, KUEPFERLE, and WIEDERSHEIM (84, **Glioma of the retina and intraocular X-ray treatment**) give the clinical history of a child whose left eye was enucleated on account of glioma, while smaller tumors of the retina of the right eye were caused to disappear almost completely together with an extremely serious visual disturbance, by X-ray treatment. It is noteworthy that the eye of the child is suited to bear filtered rays in large doses without clinically perceptible harm. Whether the retina was left perfectly intact or not cannot be determined until later, when the function may be tested. The necessary technic for the X-ray treatment by which it has been proved experimentally to be harmless to the eyes of rabbits is given.

ZENTMAYER (95, **Complete sclerosis of the retinal circulation**) describes the condition of an eye which had been blind for a number of years. The retinal vessels were completely turned into white bands and the veins and arteries were indistinguishable. The disk appeared unusually large and chalky white. There were no other fundus lesions. The patient was in the last stages of nephritis and showed typical albuminuric retinitis in the other eye. There was also a history of syphilis. ALLING.

BERRY (86, **The causes and symptomatology of impaired retinal activity**) in discussing this subject draws conclusions among which are the following:

When the brightness of the test object is lessened or there is diminution of the contrast between it and the background, the power of recognizing detail is lowered, and diminished excit-

ability, conductivity, or receptivity can be assumed in the diseased eye if visual acuteness is lowered; providing that the test object and the contrasting background are correct for the normal eye.

Light and color sense are greatly dependent upon the visual angle under which the object is seen, and greater difference can be perceived under larger than under small visual angles.

In these tests optical errors are excluded. Diffusion circles would obviously interfere with their accuracy.

CURRAN.

COATS (87, **A peculiar case of retinal atrophy in the dog**) describes a second case of retinal degeneration differing from any type familiar in human pathology. The bipolar cells of the inner nuclear layer were first affected and in more advanced areas the degeneration extended to the rods and cones and outer nuclear layer. Ganglion cells and the nerve fiber layer were well preserved throughout and there was little or no optic atrophy. There was a slight irregularity of the pigment epithelium in places and some pigment invasion of the retina in the more atrophic areas, and some collection of mononuclears around some of the retinal and a few of the choroidal vessels. There were no other changes in the choroid. Coats attributes this to a toxine having specific action on the bipolar cells.

Coats says that in the absence of appreciable choroidal change and optic atrophy, the ophthalmoscopic appearance of the retina may be normal as it was in this case.

CURRAN.

XX.—OPTIC NERVE AND VISUAL TRACT.

96. IGERSHEIMER. **Optic neuritis in acquired and congenital syphilis.** *Muenchener medizinische Wochenschrift*, p. 123.

97. MARX, E. **Ring scotoma in syphilis of the eye.** *Nederl. Tijdschr. voor Geneesk.*, 1914, ii., No. 6.

98. ROSENMAYER. **A case of transitory cortical blindness following injury to the occiput.** *Muench. med. Wochenschrift*, p. 18.

99. STRUEMPELL. **A severe case of benign optic neuritis associated with cerebellar ataxia in whooping cough.** *Deutsche Zeitschrift f. Nervenh.*, liii., 3–4.

In STRUEMPELL'S (99, **Optic neuritis and cerebellar ataxia in whooping cough**) patient, a boy 4½ years old, severe but not

apoplectiform disturbances of the walk and vision developed very rapidly. The visual disturbance amounted to amaurosis. The ophthalmoscopic picture was that of typical choked disk in both eyes. The assumption of a neuritis was justified by the absence of general symptoms of cerebral pressure. After four or five weeks the vision returned, although the papillæ had an atrophic discoloration. The comparative benignity of nervous complications in whooping cough are important therapeutically.

IGERSHEIMER (96, **Optic neuritis in acquired and congenital syphilis**) divides the inflammations of the optic nerve in congenital syphilis into three forms: (1) the meningeal, in which the sheaths only are affected, the margins of the papilla indistinct, and the vision good; (2) disease of the papillomacular bundle, in which the spirochætæ wander distally from the base of the brain; (3) affections of other parts of the optic trunk.

MARX (97, **Ring scotoma in syphilis of the eye**) thinks that the report of new cases of ring scotoma may be useful because of our insufficient knowledge of its genesis. In his patient, who was suffering from syphilis, the vision became impaired three times in the course of two and a half years without any ophthalmoscopically visible changes, but with central and ring scotomata of various forms, sizes, and strengths, which recovered more or less completely under antisyphilitic treatment. He thinks the cause was a retrobulbar neuritis between the chiasm and the entrance of the central vessels.

VISSER.

ROSENMAYER'S (98, **Transitory cortical blindness following injury to the occiput**) patient was wounded by a shrapnel bullet. The wound was in the occipital region and was suppurating. For about six days there was total cortical blindness. Then a bright streak appeared in the visual field which widened upwards so that finally only the upper halves of objects were visible. The cause of the transitory disturbance may have been a concussion of the brain, or, more probably, an œdema.

XXI.—ACCIDENTS, INJURIES, FOREIGN BODIES, PARASITES.

100. BURROWS. **Two cases of paralysis of the cervical sympathetic following delivery by forceps.** *Ophthalmoscope*, January, 1915.

101. CLAIBORNE, J. H. **A case of persistent ring scotoma following**

repeated and prolonged gazing at a furnace fire. *Annals of Ophthalm.*, January, 1915.

102. GROSSMANN. **Stab wound of the orbit with a pitchfork with an interesting condition of the visual field.** *Muench. med. Wochenschrift*, p. 477.

103. HOEVE, VAN DER. **An unusual way of wounding the optic nerves.** *Nederl. Tijdschr. voor Geneesk.*, 1914, ii., No. 6.

104. JESSOP. **Discussion on ophthalmic injuries in warfare.** *Ophthalm. Society of the United Kingdom*, April 22, 1915.

105. KLEIJN, DE A. **Progressive optic atrophy after fracture of the skull.** *Ophthalmoscope*, May, 1915.

106. MYERS. **A contribution to the study of shell shock.** *Lancet*, February 13, 1915.

107. OEHMIG. **A case of right-sided homonymous hemianopsia after injury to the occiput with a fragment of a grenade.** *Deutsche med. Wochenschr.*, p. 239.

108. PÁLICH-SZÁNTÓ. **Contribution to the origin of traumatic disease of the macula.** *Klin. Monatsbl. f. Augenheilkunde*, January, 1915, p. 56.

109. TRESLING. **Injuries of the optic nerve.** *Ibid.*, February–March, p. 188.

110. WADDY, R. GRANVILLE. **A case of destruction of the cortical visual centers by a rifle bullet.** *Ophthalmoscope*, April, 1915.

A. DE KLEIJN (105, **Progressive optic atrophy after fracture of the base of the skull**) has studied a second case in which slow progressive atrophy of the optic nerve takes place on both sides. In this case there were no signs of inflammation, no neuralgia nor nasal anomalies, but the first and second branches of the fifth nerve were painful and later there was some pain round the right eye. He suggests the formation of a callus about the optic foramen as the cause.

CURRAN.

OEHMIG (107, **Right-sided homonymous hemianopsia after injury to the occiput**) reports a case of this nature after a wound from a fragment of a grenade. The patient was unconscious for eight days, and then blind for fourteen, probably because of commotio retinæ. After vision of $\frac{6}{6}$ had returned there remained a right-sided homonymous hemianopsia that unfitted him for military service.

JESSOP (104, **Discussion on ophthalmic injuries in warfare**) has seen and studied fifteen cases in which papillœdema was a complication of injuries to the skull. The nature of such injuries is generally a depressed fracture. The swelling is limited to the disk and usually subsides after decompression

operation in five or six days. The sight is not affected because of the recent appearance of the œdema and hemorrhages are usually absent. The fields and color sense show no change. Jessop also gives details of two cases of occipital injury and complete blindness followed by permanent changes in the field of vision almost symmetrical in each eye. He thinks that in these cases the shock of injury is transmitted through the commissural fibers to the visual center on the other side. The opposite side may recover and leave one side affected. Temporary blindness was also produced by shock, especially in the beginning of the war, which may have been either psychic or from commotio cerebri.

CURRAN.

R. GRANVILLE WADDY (110, **A case of destruction of the cortical visual centers by a rifle bullet**) reports a case of a soldier who was shot through the back of the head—the bullet entering the side of the skull and making a clean cut through a like place on the other side, thus passing through about the junction of the parieto-occipital lobes of both sides. The vision is now coarse hand movements in both eyes. Waddy thinks that this case would still agree with Ferrier's theory that central vision may be represented in the angular gyrus and that this region may have suffered injury, notwithstanding that the passage of the bullet appeared to be clearly cut.

CURRAN.

MYERS (106, **A contribution to the study of shell shock**) studied three cases. They all complained of sleeplessness followed by amblyopia and reduced visual fields, and the senses of smell and taste were dulled, and one also had reduced hearing. In two cases memory was affected. Myers considers that the condition is closely related to hysteria.

CURRAN.

GROSSMANN (102, **Stab wound of the orbit with a pitchfork, with an interesting condition of the visual field**) reports a case of this nature. The vision was $\frac{1}{10}$. Ophthalmoscopically there was a pallor of the temporal side of the disk. In the nasal lower part of the visual field there was a sector-shaped contraction for white, red, and green; in addition there was an absolute central scotoma for green, and a ring scotoma about the point of fixation. The sector-shaped contraction he

ascribed to a defect in the section of the optic nerve; the central and ring scotomata to an inflammation following the injury.

PALICH-SZÁNTÓ (108, **Traumatic disease of the macula**) says that circumscribed hemorrhages may take place at the macula in consequence of a contusion of the globe either between the retina and choroid, or in the deeper layers of the retina. These hemorrhages may cause a detachment of the retina, which sometimes is evident only through the formation of folds. The precondition to this foldlike detachment is that the hemorrhage is so small that it can affect only one point in the retina. The picture of retinitis proliferans may develop and cast that of the detachment completely into the background through a connective-tissue organization of the hemorrhage.

VAN DER HOEVE (103, **Unusual way of wounding the optic nerves**) reports a case in which a stab wound at the outer canthus of the left eye injured the right optic nerve. The left eye was uninjured. The knife blade was broken and a piece 8.7*cm* long by 2*cm* broad remained deep in the wound.

TRESLING (109, **Injuries of the optic nerve**) reports two peculiar cases. The most probable explanation of both cases is a contralateral wound of the optic nerve. In the first case there was a stab wound at the outer side beneath the left eyebrow, the upper lid uninjured, the lower split vertically. In the eyeball there was a large incised wound from above downward through the sclera along the limbus. Vision was lost. Movements of the eye were possible, but of little extent. In the right eye there was ptosis, ecchymosis of both lids, protrusion of the globe, subconjunctival hemorrhage, pupils wide and without reaction, the eye immovable in any direction, the papilla indistinct, the blood-vessels broad and dark, the cornea anæsthetic. Six months later the left eyeball was atrophic. The right cornea was still anæsthetic, otherwise the trigeminus was intact; the upper lid hung down loosely. Only a slight elevation of the globe was possible and this was accompanied by a rolling outward. The pupil was immovable, the optic nerve atrophic, the eye was blind.

The second case was likewise one of stab wound, this time beneath the left eye on the malar bone, about 2*cm* long.

Aside from a slight limitation of movement downwards the condition of this eye was normal. The right eye on the other hand exhibited ptosis, exophthalmos, immovable globe, a moderately dilated, reactionless pupil, a hyperæmic papilla, engorgement of the veins, vision 0. The upper lid could be lifted only with an effort. A roentgenogram taken two weeks after the injury showed a large piece of the blade of a knife sticking in the skull; this proved, when removed, to be 9*cm* long by 2*cm* broad.

BURROWS (100, **Two cases of paralysis of the cervical sympathetic following delivery by forceps**) reports two cases, one a woman with enophthalmos, ptosis, and contracted pupil since birth. Instruments were used at birth. The second was a child of fourteen months, also with enophthalmos, ptosis, and contraction of the left pupil. The birth was difficult and instruments were used.

CURRAN.

CLAIBORNE'S (101, **Persistent ring scotoma following gazing at a fire**) patient had been accustomed to gaze at a furnace fire through a small round window. The ring of the scotoma was a zone about 5° broad and leaving a central view approximately 5° in diameter. The scotoma was not absolute.

It had existed without change for a year and only one eye was affected. The periphery of the field was somewhat narrowed. He explains the form of the scotoma by the fact that the cones in the fovea more readily recover their function.

ALLING.

SECOND QUARTER, 1915.

I.—GENERAL OPHTHALMIC LITERATURE.

See Book Reviews.

II.—RELATIONS OF OPHTHALMIC TO GENERAL DISEASES, INCLUDING POISONS.

1. HIRSCHFELD, H. **A case of chloroma.** *Berl. klin. Wochenschr.*, 1915, p. 699.

2. TARLE, J. **Contribution to the relation between acute retrobulbar neuritis and multiple sclerosis.** *Klin. Monatsbl. f. Augenheilk.*, April–May, p. 412.

3. WURDEMANN, H. V. **The eye symptoms in hypophyseal diseases.** *Ophthalmology*, April, 1915.

TARLE (2, **Acute retrobulbar neuritis and multiple sclerosis**) investigated twenty-nine cases of acute retrobulbar neuritis in which disease of the orbit and of the accessory sinuses as well as intoxication were excluded to determine the time of onset of neurological symptoms indicative of multiple sclerosis. In eleven, more than a third, the neurological symptoms together with the eye condition rendered the diagnosis of multiple sclerosis positive. The most important of these symptoms are dizziness, a spastic form of walking associated with ataxia and paresis, trembling and intention tremor, nystagmus, disturbances of speech and sensibility, paræsthesias, absence of the abdominal reflex, muscular rigidity, motor weakness, Babinski, Romberg, patellar, and foot clonus, exaggerated and unequal reflexes, facial paresis, uncontrollable laughter, and constrained position of the mouth. In four other cases these symptoms were not so marked that the diagnosis could be made from them alone, but in connection with the ocular trouble they made the diagnosis of multiple sclerosis very probable. In eleven cases various disturbances of the nervous system were demonstrable, but no positive diagnosis could be drawn from them. The neurological examination revealed no disturbances in only three cases.

HIRSCHFELD (1, **A case of chloroma**) reports the case of a girl 8 years old who had a tumor of the right side of her face that originated from the upper jaw. The eye was forced forward and upward, evidently by a growth in the back part of the orbit, and was covered by very thin lids, the lower of which was everted. The eye was blind from optic atrophy. There was a slight swelling of the cervical glands and a large tumor of the spleen. The blood count showed 25% of polymorphonucleated leucocytes, 12% small lymphocytes, 5% large mononucleated cells, and 58% myeloblasts that were large, as a rule.

WURDEMANN (3, **The eye symptoms in hypophyseal diseases**) describes the ocular findings in four cases. 1. Typical case of acromegaly. Slight non-progressive atrophy of the optic nerve. Fields slightly contracted with inversion of the red fields. 2. Acromegaly. Fields show temporal hemianopsia. 3. Secondary atrophy in the right disk. Left swollen, atrophic. Vessels tortuous. X-ray shows pituitary tumor. 4. Partial

atrophy of optic nerve and retina. Fields hemianopic type and derangement of the color fields. X-ray shows an exostosis in each optic foramen.

ALLING.

III.—GENERAL AND EXPERIMENTAL PATHOLOGY AND TREATMENT.

4. CAVARA. **The specific action of optochin in pneumococcal infection of the cornea.** *Klin. Monatsbl. f. Augenheilkunde,* 1915, p. 601.

5. SEIBERT, E. G. **Subconjunctival injections of salvarsanized serum in ocular syphilis.** *Journal A. M. A.*, May 15, 1915.

6. STENGELE. **The use of optochin in various external diseases of the eye.** *Klin. Monatsbl. f. Augenheilkunde,* April–May, 1915, p. 446.

According to CAVARA (4, **Specific action of optochin**), a 1% solution of optochin, the concentration in which this drug is employed usually, is absolutely harmless. Optochin produces an incomplete, long persisting anæsthesia of the cornea, interferes in no way with the healing of defects in the cornea, but on the contrary favors the regeneration of tissue. After several instillations it induces a slight mydriasis and slightly lowers the intraocular tension. He reports fifty-five cases of pneumococcal infection in which he has used optochin and concludes from his experience that the best results are obtained in fresh, superficial ulcers, while the deeper ones are not influenced so certainly. The simultaneous occurrence of a dacryocystitis does not exert an unfavorable influence upon the course of healing, yet it is well to avoid making pressure upon the lacrimal sac so as to occasion a regurgitation of pus. The extirpation of the sac can be postponed until after the healing of the ulcer. The corneal scar usually is delicate and thin. This treatment is to be preferred to cauterization because it induces healing more rapidly, does not destroy any healthy tissue, and is simple and easy of application, so that it is fitted for the use of the general practitioner.

STENGELE (6, **Optochin**) has seen good results from the use of optochin in two cases of ulcus serpens and extols the effect that the instilled drug exerts upon the lacrimal sac, especially when it is injected into the passage. After extirpation of the sac the dressing may be omitted, as this is apt to affect injuriously the healing of the ulcer. It is better to remove the

sac after the ulcer has healed. He has noticed also that the photophobia of scrofulous inflammation of the eye is relieved by optochin, so that the rhagades of the lids are allowed to heal. This effect he is inclined to ascribe to the bactericide action of the optochin, rather than to its anæsthetic powers. Old solutions of optochin lose their efficiency completely.

SEIBERT (5, **Subconjunctival injections of salvarsanized serum in ocular syphilis**) advocates this method of treatment, citing three cases in which he obtained good results. He thinks, as the salvarsanized serum is known to have strong spirochætacidal powers, that there is a great advantage in administering it locally in the affected tissues. The procedure is safe and may be justifiable logically.

ALLING.

IV.—METHODS OF RESEARCH, REMEDIES, INSTRUMENTS, AND GENERAL OPERATIVE TECHNIC.

7. EWING, E. W. **A new conjunctival flap incision in cataract extraction.** *American Journal of Ophthalmology*, April, 1915.

8. FALTA. **A simple method of detecting one-sided blindness and high amblyopia.** *Wochenschr. f. Therap. u Hygiene d. Auges*, xviii., 29.

9. HENKER. **An adjustable loupe.** *Zeitschr. f. Ophthalmol.*, Optik iii., p. 42.

10. KUNZ and OHM. **Photographic measurement of the distances between the eyes and the pupils in movements of the eyes from below upward in the middle line.** *Arch. f. Ophthalmologie*, lxxxix., 3, p. 469.

The method described by FALTA (8, **Method of detecting one-sided blindness and high amblyopia**) is the well-known one of approaching the tip of the finger toward the root of the nose of the patient and having him fix his eyes upon it; under normal conditions both eyes converge equally and maintain their convergence, but if one eye is blind or very amblyopic it will soon deviate. He says that a moderate degree of amblyopia may be recognized in this way also as the affected eye returns more quickly to its primary position than the other.

KUNZ and OHM (10, **Photographic measurement of the distances between the eyes during movements upward**) find that in many cases a mathematically exact, ideal movement of the eyes takes place, even after binocular vision has been abolished, while in others the distance between the eyes is least when they are looking downward and increases as they

move upwards. The size of the pupils seems to increase with the greater distance of the eyes from each other. In miners with nystagmus they found cases with an ideal balance, and others with an increasing divergence.

HENKER (9, **An adjustable loupe**) has improved the binocular loupe by the addition of a screw adjustment by which the lenses can be adjusted to the pupillary distances of different persons without loss of centering or of stereoscopic vision.

EWING (7, **A new conjunctival flap incision in cataract extraction**) produces an extensive conjunctival flap by pinching the conjunctiva on either side of the horizontal line of the cornea with a double fixation forceps and drawing it somewhat over the cornea. In making the incision at the limbus there is a large flap produced.

ALLING.

V.—ANATOMY, EMBRYOLOGY, MALFORMATIONS.

11. CLAPP, C. A. **Ciliary processes in the pupillary area.** *Ophthalmic Record*, June, 1915.

12. GRAHN, E. **Concerning signs of differentiation of the lens during embryonal life.** *Anat. Anzeig.*, xlviii., p. 81.

13. LUEDECKE. **Anatomy of coloboma of the entrance of the optic nerve.** *Klinische Monatsblaetter f. Augenheilkunde*, liv., p. 468.

14. KOLMAR. **Histology of the ocular membranes.** *Anat. Anzeiger*, xlvii., p. 417.

15. LINDAHL, C. **Development of the anterior chamber.** *Anat. Hefte*, lii., p. 195.

16. RISLEY, S. D. **Hereditary aniridia. An interesting family history.** *Journal A. M. A.*, April 17, 1915.

LUEDECKE'S (13, **Anatomy of coloboma of the entrance of the optic nerve**) case was one of true coloboma of the optic nerve. The section showed below a notch which was filled with masses of connective tissue. At the margin of the nerve were wavy bands of connective tissue that bent back to the sclera, which was thickened at this place. Within this thickened portion lay a chaos of glial masses and connective tissue. At the lower margin of the nerve there was a deep notch, the inner surface of which was lined sparsely with glial tissue. It was also connected with a small cystic cavity likewise lined with glia. There was also a formation of folds in the retina.

KOLMAR (14, **Histology of the ocular membranes**) finds that at birth there is a marked lack of development of the visual cells in the fovea as compared with the periphery of the retina. In the latter these cells have their characteristic forms, although perhaps not completely developed in length, while in the fovea the cones are still quite plump and undeveloped. The thinning of the inner layers of the retina in the fovea likewise is not present.

GRAHN (12, **Signs of differentiation of the lens during embryonal life**) finds in the embryos of mammals, the same as Rabl, bleblike masses between the posterior pole of the lens capsule and the posterior ends of fibers that apparently spring from the capsule. While Rabl took these formations to be produced artificially by the fixation, Grahn considers them to be physiological and a peculiar process of differentiation of the embryonal lens. The bleblike formations appear most often where the nuclei of the fibers are pycnotic and the constituents of the nucleus spread into the protoplasm. These degenerative products of the embryonal lens fibers pass from the mass of fibers and enter the interspace between these and the posterior capsule. The granules frequently found between the bright blebs may be referred to the breaking down of the nuclei. Another condition observed in a human embryo 13*mm* long, and confirmed in some other mammal embryos, was that a corresponding mass of detritus lay against the anterior pole of the lens so as to give the impression that the blebs were the snared-off anterior ends of the lens fibers. Grahn's conclusions are that the size of the embryonal lens is very great at first, and later decreases gradually until it reaches its definite limits. This takes place by way of the destruction of a number of fibers, the broken-down products of which are carried away by the blood-vessels of the tunica vasculosa, assisted by the phagocytic action of the leucocytes. Or one may suppose that the provisory structure of the lens is replaced by the final, as is the case in many other organs.

LINDAHL (15, **Development of the anterior chamber**) considers that the theory that the anterior chamber is formed by a split in the mesenchyma in front of the lens is untenable. He believes it to be not a secondary formation, but a primary space present from the beginning between the lens and the

superficial ectoderm. Its final development is brought about by the lateral encroachment of the mesenchyma.

RISLEY'S (16, **Hereditary aniridia**) patient showed complete absence of iris. In the second generation there were 4 males and 9 females with similar condition. In the third generation 32 males and 31 females. In the fourth, 19 males and 23 females.

ALLING.

CLAPP (11, **Ciliary processes in the pupillary area**) examined a syphilitic child five months old and found the pupils immobile to light, dilating slowly with atropine, and between the iris and lens, projecting into the pupillary area, a fringe-like circle of pigmented bodies. A few years later all but three of the projections had disappeared from the left eye while the pupil of the right was occluded by posterior synechiæ. He suggests that the lesions were syphilitic growths from the ciliary body, but the title seems a bit inaccurate.

ALLING.

VI.—THE SENSE OF SIGHT.

17. BALEY. **Contribution to the color vision of the half-closed eye.** *Zeitschrift f. Sinnesphysiologie*, xlix., p. 79.

18. BRAUNSCHWEIG. **Brief communication concerning epidemic hemeralopia in the field.** *Muenchener medizinische Wochenschrift*, 1915, p. 308.

19. CALLOMON. **Serum exanthem with green vision after injection of tetanus antitoxin.** *Medizinische Klinik*, p. 752.

According to BALEY'S (17, **Color vision of the half-closed eye**) observations, colored surfaces that have been regarded fixedly for a while appear to be changed in color, usually to the complementary, when the eyes are half closed. The same phenomenon may be observed after the interposition of a smoky gray glass, which darkens the surface looked at, and under similar conditions. No explanation is afforded.

BRAUNSCHWEIG (18, **Epidemic hemeralopia in the field**) has met with an epidemic form of hemeralopia that appears frequently among the troops, in which there is no disease of the internal organs. He says also that spots of epithelial xerosis which play such an important part in the diagnosis are always absent. He is inclined to ascribe as the cause the

presence of errors of refraction. Prolonged service at observation at night in the trenches also may readily bring about an exhaustion of the retina.

CALLOMON (19, **Serum exanthem with green vision after injection of tetanus antitoxin**) reports a peculiar case. A wounded man was injected with one hundred units of tetanus antitoxin Hoechst because of symptoms of tetanus. Although the morbid symptoms retrograded quickly, there appeared on the thirteenth day an extensive exanthem associated with green vision that lasted several hours. During this time everything appeared green to the patient.

VII.—ACCOMMODATION AND REFRACTION.

20. LAUBER. **Accommodation glasses.** *Arch. f. Ophth.*, lxxxix., p. 404.
21. WEIGELIN. **The frequency of glasses among troops.** *Wuerttemb. med. Korrespondenzbl.*, 1915.

LAUBER (20, **Accommodation glasses**) has devised spectacles composed of two glasses, one in front of the other, with such an adjustment that the anterior can be moved forward from the posterior and thus increase the refractive power of the combination. The greatest possible increase of the refraction in this way is 4 D, so that the eye can read easily at 25*cm.* There is naturally a certain degree of limitation of the field.

Among 11,000 men WEIGELIN (21, **Glasses among troops**) found 381 who were wearing glasses. In a volunteer snowshoe division of 170 men, 34 wore glasses. The number of myopes was considerably greater than that of the hypermetropes, but he supposes that the moderate degrees of hypermetropia were compensated for by the accommodation.

VIII.—THE MOTOR APPARATUS OF THE EYE.

22. ENGELHARDT. **A family with hereditary nystagmus.** *Zeitschrift f. d. Auges Neurol. und Psychiatr.*, xxviii., p. 319.
23. OHM. **Contribution to the study of miner's nystagmus.** *Archiv f. Ophthalmologie*, lxxxix., p. 505.
24. SCHMIDT. **Monolateral nystagmus.** *Klinische Monatsblaetter f. Augenheilkunde*, April–May, 1915, p. 497.

ENGELHARDT (22, **Family with hereditary nystagmus**) gives the family tree of 212 persons in five generations, twenty of

whom suffered from nystagmus. A certain degree of optic atrophy often was present, and this he takes to be the cause of the fairly marked impairment of vision. He also found that the pupils of the patients were discolored gray. He believes that the nystagmus and atrophy are independent hereditary units, and that the former does not depend on the bad vision. The type of heredity was the well-known one in which color blindness and other troubles are present.

SCHMIDT (24, **Monolateral nystagmus**) finds the same forms in monolateral as in bilateral nystagmus. He divides the cases into those associated with diseases of the central nervous system, strabismus, amblyopia of the nystagmic eye, and monolateral nystagmus with concomitant movements of the head, but there are cases that are not included in these groups.

OHM (23, **Miner's nystagmus**) finds from a systematic comparison of miners who have and have not nystagmus that a reduction of the light sense seems to play an important part in the production of miner's nystagmus, but considers this to be only a single link in the chain of causes. He found exophoria with or without hyperphoria present frequently, while lack of binocular vision was fairly rare. Alcoholism and the size of the body each exercises a harmful influence to a certain degree, and there are other predisposing factors.

IX.—LIDS.

25. PÁLICH-SZÁNTÓ, O. **The various forms of cancer of the lid.** *Arch. f. Augenheilkunde*, lxxix., 1, p. 16.

PÁLICH-SZÁNTÓ (25, **Cancer of the lid**) describes twelve cases of carcinoma of the lid observed in Budapest during the last three years. The microscopic examination showed that eleven were cases of basal cell cancer and only one of horny epithelial cell cancer.

X.—LACRIMAL ORGANS.

26. PRATT, J. A. **Intranasal drainage of the lacrimal sac. A simple method.** *Ophthalmic Record*, April, 1915.

27. v. SKRAMLIK, E. **Argyrosis of the lacrimal sac.** *Klin. Monatsbl. f. Augenheilkunde*, April–May, 1915, p. 443.

PRATT (26, **Intranasal drainage of the lacrimal sac**) opens either the upper or the lower canaliculus so that he can pass

No. 14 Theobald probe and introduces a *2mm* or *3mm* burr to the bottom of the sac, pointing it toward the opposite side of the chin. The drill is then set in motion and a hole about *6mm* or *8mm* in size is made into the nose. He has performed the operation seven times with satisfactory results.

ALLING.

VON SKRAMLIK'S (27, **Argyrosis of the lacrimal sac**) patient had instilled a one per cent. solution of colloidal silver into her eye occasionally for six months, and continuously for about three weeks. In addition to an indolent ulcer of the cornea there was a marked gray-violet stain of the entire conjunctiva and a dacryocystitis. The lacrimal sac was examined microscopically after extirpation, and its subepithelial connective tissue was found to be stained a bright brown. The stain was most intense in certain fibers of connective tissue, bundles of which were colored completely and diffusely. In the deep parts of the wall large and small granules that looked gray or black were to be seen within the cells or deposited on the elastic fibers. The subepithelial capillary walls were encrusted and there were abundant minute and coarser granules within the connective-tissue investing cells. No silver granules were found in the epithelium. That this stain was caused by silver was proved by pouring over the tissue a five per cent. solution of potassium cyanide, which immediately decolorized the diffusely brown connective-tissue fibers and dissolved the intracellular granules. The author believes this diffuse stain to have been made by an albuminate of silver. Such a deposit of silver takes place the more readily the more easily the preparation penetrates into the mucous membrane, and the most dangerous in this respect are the colloidal combinations of silver, which should never be instilled for a long time without constant control.

XI.—ORBITS, INCLUDING EXOPHTHALMOS, ACCESSORY SINUSES.

28. BIETTI, A. **Metastatic endothelial sarcoma in the inferior rectus.** *Klinische Monatsblaetter f. Augenheilkunde*, April–May, 1915, p. 462.

29. DE SCHWEINITZ, G. E. **Homonymous crescentic scotomas in association with ethmoiditis and tooth abscess.** *Ophthalmic Record*, April, 1915.

30. LAMB, R. S. **Subperiosteal blood cyst (?) of the orbit simulating osteosarcoma.** *Ophthalmology*, April, 1915.

31. SEIDEL, E. **Conduction anæsthesia through injection into the posterior part of the orbit.** *Archiv f. Ophthalmologie*, lxxxix., 3, p. 414.

SEIDEL (31, **Conduction anæsthesia**) has found the combination of infiltration and conduction anæsthesia formerly recommended by him not applicable to all cases. In inflammation and serous saturation of the peribulbar tissues, the injection about the eyeball is too painful; it cannot be used when malignant neoplasms occupy the entrance to the orbit, and difficulties present themselves in staphylomata, and when the eye has been opened by a broad wound. He has therefore devised a new method which he thinks may be applicable to all cases. The object is to place a small quantity of highly concentrated solution of novocain and adrenalin near the apex of the orbit. The needle is entered below the malar bone, carried along the posterior wall of the upper jaw through the posterior third of the inferior orbital fissure into the orbit vertically to its axis. Anæsthesia is present in twenty minutes. For a full description of the technic reference must be made to the original. He uses a needle eight centimeters long and injects from four to six cubic centimeters of a two or four per cent. solution of the drugs named. The painless introduction of the needle is secured by two preliminary injections of a one per cent. solution of novocain and adrenalin, one in the skin, the other on the posterior surface of the superior maxilla in the pterygopalatine fossa.

LAMB'S (30, **Subperiosteal blood cyst (?) simulating osteosarcoma**) patient, six months after a head injury, noticed that his eye was protruding and that he was having considerable pain. Three and a half years later the proptosis was marked and a hard tumor could be felt in the upper-central part of the orbit. Operation proved the tumor to be a cyst containing a brown fluid with yellow dust-like crystals. It had eroded the roof of the orbit. From examination of the cyst wall a diagnosis of angiosarcoma was made.

ALLING.

BIETTI'S (28, **Metastatic endothelial sarcoma in the inferior rectus**) 65-year-old patient had suffered for some years from pain in the upper lumbar region. Finally bilateral exoph-

thalmos appeared, more pronounced on the left side. The movements of the left eye were slightly restricted. The exophthalmos of the right eye passed away, while the symptoms in the left increased, and at the end of three months a hard mass appeared in the right side of the abdomen, and soon afterward small nodules in the skin of the body. On autopsy a retroperitoneal neoplasm was found with numerous metastases throughout the body, one of which formed a lump as large as a hazel-nut in the inferior rectus of the left eye. Incision showed this tumor to be of fibrous consistence and to contain some hemorrhagic striæ. Microscopical examination showed that this as well as the parent tumor was an endothelioma, though at first sight it resembled an alveolar sarcoma.

DE SCHWEINITZ'S (29, **Homonymous crescentic scotomas with ethmoiditis and tooth abscess**) patient showed a crescentic scotoma about 5° to the right of each fixation point. The blur was first noticed a month before, after an attack of sharp pain over the eye. The ophthalmoscopic examination was negative, but a chronic ethmoiditis was discovered and large abscess cavities were found at the roots of the incisor teeth by means of the X-ray. Ten days after treatment for these troubles the scotomas were greatly reduced. Doubt is expressed as to which of the two foci of infection was the more to blame.

ALLING.

XII.—CONJUNCTIVA.

32. GRADLE, H. S. **The specific treatment of Morax-Axenfeld conjunctivitis.** *Ophthalmic Record*, April, 1915.

33. PADERSTEIN. **Dermoid of the conjunctiva.** *Deutsche med. Wochenschr.*, p. 481.

GRADLE (32, **Specific treatment of Morax-Axenfeld conjunctivitis**) has used a fluorescin-zinc compound advocated by Wolff for this disease, and in fifteen cases, with few exceptions, one treatment was sufficient to effect a complete cure. The application is not accompanied by much reaction.

ALLING.

PADERSTEIN (33, **Dermoid of the conjunctiva**) removed a tumor from the palpebral fissure of a child near the external canthus, which appeared like a thickened duplicature of the

conjunctiva, with a crescentic margin toward the cornea and passing over into the transitional folds above and below. It was found to be composed of compact, true dermatoidal tissue.

XIII.—CORNEA AND SCLERA.

34. UHTHOFF, W. **A case of bilateral, central, punctate, subepithelial keratitis, the nodular keratitis of Groenouw, with anatomical findings.** *Klinische Monatsblaetter f. Augenheilkunde*, April–May, 1915, p. 377.

35. UHTHOFF, W. **Bilateral symmetrical degeneration of the cornea with deposits of uric acid and acid sodium urate in otherwise normal eyes of a patient in good general condition.** *Ibid.*, April–May, 1915, p. 383.

Symmetrical changes in the central part of both corneæ were present at the first examination of UHTHOFF's (34, **Bilateral, central, punctate, subepithelial keratitis**) case. There were numerous little gray patches situated beneath the smooth epithelium, which were for the most part round, some elongated. These little patches blended partially so as to give a grayish appearance. There were no signs of external inflammation. Abrasion did not do away with the opacities completely. Two months later abrasion was performed again on part of the little gray patches which lay somewhat deeper and persisted. Two and a half years later the numerous little foci had coalesced so as to form a fine lattice-work picture. The microscopic examination of a part of the superficial layers of the cornea, which were removed, showed: 1, partial thickening in places of the epithelial layer which protruded backwards and had caused atrophy of Bowman's membrane where it was touched; 2, little patches of crumbly or homogeneous hyaline masses beneath the epithelium and the preserved Bowman's membrane; 3, hyaline deposits beneath Bowman's membrane in the form of broad homogeneous bands; occasionally a slender homogeneous hyaline band passed through Bowman's membrane to the epithelial layers; 4, the epithelial layer was for the most part intact. The author discusses whether a degeneration of the cornea that is at first nodular and punctate may not pass into a lattice-like form in a later stage, and whether it may not be justifiable to differentiate strongly between these two forms, especially as both often have a family, hereditary character, which was present in his case.

In UHTHOFF's (35, **Symmetrical degeneration of the cornea**

with deposits of uric acid and acid sodium urate in otherwise normal eyes) case the condition had begun sixteen years before as an episcleritis, as the cornea was intact save for a marginal injection. Later the clinical picture assumed the type of a primary corneal degeneration. A degenerative opacity developed in the marginal portion of the cornea which was so extensive that only the central part and the part just above the center remained transparent. The marginal parts showed a dense, uniform, grayish yellow opacity of the parenchyma, the surface was smooth and the line separating the affected from the sound tissue fairly sharp. With a powerful magnification brilliant, glittering deposits could be seen in the opaque substance. Examination of a freshly excised piece of the tissue showed the presence of numerous needle-like crystals of acid sodium urate. The presence of uric acid and sodium urate was proved chemically. The nuclei of a part of the epithelial cells were atrophied and destroyed. The epithelial layer was preserved, although its normal lamination was not demonstrable frequently, and in places the cells had undergone bullous degeneration and formed little hollow spaces in the epithelial layer. Little erosions occurred here and there, which at some places had become deeper defects. A very marked condition in a large extent of the section was a broad, netlike layer of tissue, the trabeculæ of which plainly consisted of swollen homogeneous connective tissue. The superficial layers beneath Bowman's membrane passed gradually into fibrillary degeneration, and the deeper layers of the stroma were degenerated in the same way. At other places there were numerous hollow spaces which did not present a vascular structure. The cell nuclei of the stroma were in part destroyed, and the stroma itself in many places was in a homogeneous hyaline condition; in these regions Bowman's membrane was well preserved and the epithelial layer showed only traces of hyaline degeneration and cell necrosis. The deposit of urates was particularly marked in the diseased tissue. Gout was excluded after repeated examinations of the patient. Whether the deposit of urates in the corneal tissue should be looked upon as primary and the other changes as secondary or the reverse is uncertain. All the therapeutic measures that were undertaken proved of no avail.

XIV.—IRIS AND PUPILS.

36. Bock. **Tuberculosis of the iris cured by the immune bodies of Karl Spengler.** *Zentralbl. f. prakt. Augenheilkunde*, June, 1915, p. 115.

37. Dernehl, P. H. **Chronic prostatitis a probable factor in iritis.** *Ophthalmology*, April, 1915.

38. Nonne. **Another case of alcoholic reflex immobility of the pupil.** *Neurolog. Zentralblatt*, p. 254.

Nonne (38, **Alcoholic reflex pupillary immobility**) adds another case of this nature to the one reported by him three years ago. The man was an alcoholic with no trace of syphilis. Wassermann was negative, even when the patient was under the influence of liquor. For four months he had a positive reflex immobility of his pupils. The fundus was negative and there was no disturbance of the visual field, so that an optic neuritis either at the entrance or retrobulbar was positively excluded. A slow reaction of the pupils to light appeared at the end of four months.

Bock (36, **Tuberculosis of the iris cured by immune bodies**) adds a new case to those already reported in which a tuberculosis of the iris was cured although there were signs of tuberculosis elsewhere in the body. He recommends the immune bodies as especially indicated in scrofulous diseases of the eye.

It has been customary to classify cases of iritis of indefinite origin as rheumatic or idiopathic, but Dernehl (37, **Chronic prostatitis a probable factor in iritis**) thinks that many of them may be due to past gonorrheal infection. The thought is not a new one. He describes three cases in which there was a history of gonorrhea respectively 6, 10, and 20 years previous. All suffered also from chronic prostatitis. Gram negative diplococci resembling gonococci morphologically were found in the prostatic secretion in each case.

Alling.

XV.—LENS.

39. Schanz. **The effects of light upon the living cell.** *Muenchener med. Wochenschrift*, p. 643.

40. Schanz. **More concerning the origin of far-sightedness and of cataract.** *Archiv f. Ophthalmologie*, lxxxix., 3, p. 556.

41. Schanz. **The effects of light upon the living substance.** *Arch. f. d. ges. Physiologie*, clxi., p. 384.

42. ZYDEK. **Concerning the heredity of cataract.** *Klinische Monatsbl. f. Augenheilkunde*, April–May, 1915, p. 482.

SCHANZ (39, 40, and 41, **Effect of light upon the living cell, and the origin of cataract**) considers this subject in three different papers. Chalupecky has shown that by irradiation with the quartz lamp easily soluble albuminoids may be transformed into those that are soluble with difficulty or insoluble from solutions of egg albumen and lens albumin. Globuline and coagulated albumin are formed from the albumins. This does not take place in the dead lens alone, but also in living ones, more markedly in albinotic than in pigmented animals. There still remains a region in the plane of the greatest efficiency between the ultraviolet and the visible rays. It is suggested that a part of the rays from the blue and violet regions remain in the lens, at least in old people, and work continuously, and as we know that under such influences of light easily soluble albuminoids are changed into those that are insoluble or soluble with difficulty he thinks it probable that such transformations may take place finally in the lens. In addition we know that the lens in old age contains more albuminoids that are soluble with difficulty or insoluble than in youth, and this may have a connection. This is particularly the case in senile cataract, so he is inclined to look upon this as the end of this process of transformation of albumin. Cataract is not more common in the mountains than in the valleys because a greater part of the quantity of rays strike the outer eye and cause the inhabitants to protect their eyes more against the direct sunlight, while diffused light, which acts particularly upon the lens, is less than in the valleys.

ZYDEK (42, **Heredity of cataract**) concludes from a study of the literature that there is a heredity of senile cataract, which may appear at continuously earlier ages in succeeding generations; in this way the cataract may be said to be congenital. We may assume further what was not brought out in the material, that heredity of cataract is possible through indirect causes, like arteriosclerosis, but such an origin leads us back to cataract dependent on variations of the germinal plasma. Either the capsular epithelium is so inferior that it is unable to perform its duty after a number of years and then lenticular

opacities appear, or the lenticular fibers themselves are inferior from the start.

XVI.—VITREOUS AND CHOROID.

43. PICHLER. **Sudden paralysis of the pupil the first sign of a metastatic ophthalmia.** *Klin. Monatsbl. f. Augenheilkunde*, June, p. 682.

PICHLER (43, **Sudden paralysis of the pupil the first sign of metastatic ophthalmia**) has observed a paralysis of the pupil of the affected eye as the first sign of the onset of metastatic trouble in three patients. This sign may be of some diagnostic value, but metastatic ophthalmia occurs without any such derangement of the pupil.

XVII.—SYMPATHETIC OPHTHALMIA.

44. MELLER. **Sympathetic inflammation without disease of the second eye.** *Archiv f. Ophthalmologie*, lxxxix., 3, p. 427.

In MELLER'S (44, **Sympathetic inflammation without disease of the second eye**) case iridectomy was performed for glaucoma and a sluggish inflammation persisted for months while the other eye exhibited no symptoms of any disease except glaucoma. The diagnosis of a sympathy exciting inflammation was drawn from the histological picture.

XVIII.—GLAUCOMA.

45. HAERLE. **Late infection after Elliot's operation.** *Diss.*, Wuerzburg, 1915.

46. HEERFORDT. **Glaucoma.** *Archiv f. Ophthalmologie*, lxxxix., 3, p. 484.

47. MCCAW, J. A. **The colloidal theory of the pathology of glaucoma.** *Ophthalmic Record*, June, 1915.

48. WOOD, C. A. **A sclerocorneal seton in the treatment of glaucoma.** *Ophthalmic Record*, May, 1915.

HEERFORDT (46, **Glaucoma**) discusses the question whether venous stasis is the cause of the hemorrhagic fibrinous transudation from the vascular tunic of the eye which frequently complicates the fistula-forming operations undertaken for chronic glaucoma.

HAERLE (45, **Late infection after Elliot's operation**) adds another case of infection that took place about three months

after a trephining. No fistula was present, but the opening formed by the trephining was cicatrized over by firm connective tissue in which the atrophic iris was incarcerated. The thickened conjunctiva was permeated with cells which extended through the cicatricial tissue. There was a large ulcer of the cornea which apparently was the source of infection that had extended inward through the cicatrix.

Wood (48, **Sclerocorneal seton in the treatment of glaucoma**) following suggestions already made by others, has devised an ingenious method for the treatment of glaucoma. He has a hole drilled near the point of a cataract knife, and after passing the knife into the anterior chamber, through the sclerocorneal margin, makes a counter puncture as in anterior sclerotomy. A silk suture is then threaded through the hole and the knife withdrawn, thus leaving the two threads lying in the anterior chamber between the two wounds. The thread is cut from the knife and the four ends covered subconjunctivally well away from the cornea. It remains to be seen whether such a foreign body will prove innocuous but it seems likely that it would provide permanent drainage.

ALLING.

McCaw (47, **The colloidal theory of the pathology of glaucoma**) experimented with sheep's eyes which he had immersed in weak acid solutions and found that they absorbed water to the extent that they ruptured from the pressure induced. He was led to these investigations by the work of Fisher, who claims that increased ocular pressure is not necessarily due to disturbances in the circulatory equilibrium but to the absorption of water by so-called colloid substances in the structure of the eye, such as fibrin, albumin, etc. Glaucoma then according to this view is due to chemical change within the eye which increases the affinity of the tissues for water. Sodium citrate injections have been advocated as the proper treatment although no claim is made that a cure can be brought about.

ALLING.

XIX.—RETINA, OPTIC NERVE, AND THE VISUAL TRACT.

49. Chance, B. **Concerning two examples of a peculiar form of retinal pigmentation (Stephenson).** *Ophthalmic Record*, April, 1915.

50. HOLLOWAY, T. B. **Hole in the disk associated with vibration of an overlying membrane.** *Ophthalmic Record*, May, 1915.

51. KUTZINSKY. **Choked disk in shot wounds of the brain.** *Berliner Gesellschaft f. Psychiatrie und Nervenkrankheiten*, March 8, 1915.

52. MELLER. **Retrogression of retinal glioma.** *Zentralbl. f. prakt. Augenheilkunde*, May, 1915.

53. ROENNE. **Retinochoroiditis (Edm. Jensen).** *Klinische Monatsblaetter f. Augenheilkunde*, April—May, 1915.

54. ROENNE. **Incongruence and asymmetry in the homonymous hemianopic field.** *Ibid.*

55. VELHAGEN, C. **The clinical picture of embolism of the central artery caused by rupture of the artery in the trunk of the nerve in Bright's disease.** *Klinische Monatsblaetter f. Augenheilkunde*, June, 1915.

VELHAGEN (55, **Picture of occlusion produced by rupture of the central artery in the trunk of the optic nerve**) examined the optic nerve of an eye which had been blinded a month before with the presence of retinal ischæmia. He found in the region of the lamina cribrosa an extravasation connected with a rupture of the artery. Distal to this there were arteritic changes, proximally there was a thrombus of the vein. The proof thus furnished, that the picture of occlusion of the central artery may be caused by hemorrhages into the trunk of the nerve, throws a sidelight upon the occurrence of this disease in parenchymatous nephritis, which otherwise is difficult to understand.

ROENNE (53, **Retinochoroiditis of Edmund Jensen**) gives two clinical histories. He does not agree with van der Hoeve that the upper temporal quadrant of the visual field is always spared. He believes the disease to be more common than has been thought. It may be confounded very easily with optic neuritis, from which it may be differentiated by the defect in the field of vision, that may be relative. The ophthalmoscopically visible focus may be seated in the macula. The prognosis is good. Although the primary seat of the disease is in the choroid it is not necessary for any atrophic changes to remain in this membrane.

MELLER (52, **Retrogression of retinal glioma**) saw a boy from whom one eye had been removed because of glioma and secondary glaucoma. In the other eye he found three nodes which had grown distinctly smaller at the end of five years, so that the proliferations had become flat and the nodular pro-

trusions had disappeared. The spots resembled those produced by old choroidal changes. Although the eye had been radiated twice with the X-rays, the writer does not believe that this treatment had anything to do with the stoppage of the neoplastic process.

KUTZINSKY (51, **Choked disk in shot wounds of the brain**) saw choked disk without serious intracranial symptoms in two cases of shot wound of the occiput. Both had hemianopsia, one in a quadrant form.

ROENNE (54, **Incongruence and asymmetry in the homonymous hemianopic field**) finds that faults of investigation through differences of illumination and wavering attention come to light when the transition between absolute and relative defect is gradual. Incongruences which are no expression of the irregularity of the optical cortical center, occur in tract hemianopsias, the cause of which lies near the chiasm where one cannot assume a complete displacement of the corresponding nerve fibers. Other incongruences may exist when, in addition to the defect in the nasal field on one side, the unpaired part of the temporal field of the other is affected (Wilbrand), or when the limiting lines of the hemianopsic halves of the fields diverge outwards. He thinks Wilbrand's theory, that sometimes an irregular and incomplete mixing of fascicles occurs in the cortical observation center, is correct, but he gives it less importance than that author. It must not be forgotten that other conditions must be taken into account with regard to these anomalies in the visual field. The paradoxical diplopia after squint operations shows that binocular vision can exist without the foundation of a common fascicular field. The temporal half of the visual field functionates better than the nasal, so a defect here is more noticeable. It may be extremely difficult to explain an incongruence when a total hemianopsic defect of one eye is associated with a quadrant defect in the other. Finally there is a special group of so-called incongruences that may be ascribed to a difference in the overlapping visual fields.

CHANCE (49, **Peculiar form of retinal pigmentation**) describes a condition which he has seen four times in his experience and which has been but rarely recorded previously. The fundus changes consist of groups of intensely black pigment

spots. These are more or less angular and irregular in outline and arranged in definite groups. The choroid and retina between the pigment are normal in appearance. The spots are without halos or areas of degeneration about them. The cases do not seem to be progressive, affect only a portion of the fundus, and may occur only in one eye. It is possible that the condition is really retinitis pigmentosa.

ALLING.

In HOLLOWAY'S (50, **Hole in the disk**) case there was a pigmented area on the nerve about one third of the disk diameter in size. It seemed to be an excavation and to be covered by a gray veil which pulsated. The pulsation was probably transmitted from the retinal vessels. It was thought possible that the lesion was a cyst.

ALLING.

XX.—ACCIDENTS, INJURIES, FOREIGN BODIES, PARASITES.

56. ABELSDORFF. **Traumatic excitation of a gouty scleritis.** *Aerztl. Sachverstaendigen Zeitung*, 1915, No. 11.

57. BERNHEIMER. **Lid and conjunctival plastics in battle injuries of the eyes.** *Wiener klinische Wochenschrift*, 1915, p. 719.

58. ELSCHNIG. **Battle wounds of the eye.** *Med. Klinik*, 1915, p. 553.

59. ESCHWEILER and CORDS. **Shot wounds of the skull.** *Deutsche med. Wochenschrift*, 1915, p. 431.

60. GRUENWALD. **Shot wounds of the pneumatic cavities of the skull.** *Muenchener medizinische Wochenschrift*, 1915, No. 24, Military Supplement.

61. HANSELL, H. F. **A case of traumatic enophthalmos.** *Ophthalmic Record*, May, 1915.

62. IGERSHEIMER. **Operative experiences in battle wounds of the eye.** *Klinische Monatsblaetter f. Augenheilkunde*, June, 1915, p. 585.

63. SALZER. **Shot wounds of the region of the eye.** *Muenchener medizinische Wochenschrift*, 1915, No. 8, Military Supplement.

64. STOCK. **Battle wounds of the eye.** *Deutsche medizinische Wochenschrift*, 1915, p. 843.

65. UHTHOFF. **Two cases of injury of the trigeminus by a shot wound.** *Klinische Monatsblaetter f. Augenheilkunde*, April–May, 1915, p. 391.

66. ZADE. **Eye diseases in the field.** *Muenchener med. Wochenschrift*, 1915, Nos. 22 and 23, Military Supplement.

Naturally German medical literature just now is full of the experiences of many surgeons in military surgery, and it is also very natural that these personal reminiscences should have little in them that can be called progress in ophthalmology. Progress is doubtless being made, but not until the

war is over and the surgeons have had opportunity to digest their impressions can we expect the real progress to be formulated. Still a number bring forward interesting points.

ELSCHNIG (58, **Battle wounds of the eye**) has remarked a comparatively large number of preëxisting diseases of the eye among the soldiers. Several cases of traumatic paresis of the oculopupillary fibers of the sympathetic showed a negative adrenalin and a positive cocaine reaction. Heavy explosions in the neighborhood produced, without wounds, various psychical disturbances with defects in the functions of the eyes.

STOCK (64, **Battle wounds of the eye**) saw an optic neuritis following a shot wound of the brain recover without loss of sight. In another case he saw a rupture of the choroid with full preservation of vision although the other eye was destroyed. He also describes plastic operations to repair the destruction of the soft parts about the eye.

SALZER (63, **Shot wounds of the region of the eye**) describes a case of destruction of the right eyeball, with abscess of the orbit and later brain abscess, which recovered after operation. Like nearly all writers he emphasizes the importance of the X-rays in locating foreign bodies. He has frequently seen ruptures of the choroid or pigmentation of the retina without rupture in eyes that previously had a normal fundus. Two cases of detachment of the retina were caused by the air pressure from exploding missiles. Glaucoma was observed as the result of a severe contusion that recovered after sclerotomy.

IGERSHEIMER (62, **Operative experiences in battle wounds of the eye**) gives a number of new plastic operations for badly torn lids, and describes two cases of removal of bullets from the orbit with the aid of Kroenlein's operation, and calls attention to the complications that are apt to attend such injuries, like infection of the brain or of the accessory sinuses. He remarks that the symptoms may be slight in spite of severe injuries to the contents of the skull.

In direct shot wounds of the eye, according to BERNHEIMER (57, **Lid and conjunctival plastics**), the lids and surrounding soft parts are so badly torn to pieces that a new orbit needs to be built up before a prothesis can be worn, and this often

is a very difficult and tedious process. The demolished or atrophic eye should be extirpated as early as possible to avoid great cicatrization as well as a possible sympathetic inflammation.

ESCHWEILER and CORDS (59, **Shot wounds of the skull**) take the ground that every not absolutely hopeless case of gunshot wound of the head should be trephined as soon as possible, waiting only until the severe effect of shock has passed off. In transorbital shot wounds the roof of the orbit and the opening into the skull should be laid bare as the surest protection against abscess of the orbit and of the brain.

GRUENWALD (60, **Shot wounds of the pneumatic cavities of the skull**) describes several cases, chiefly of the antrum of Highmore, which were often complicated with injuries of the eye. Both maxillary sinuses may be shot through without very great deformity resulting. Such a condition produces nosebleed for some days. A shrapnel ball in a sphenoidal cell caused pain on movements of the eye and was finally removed endonasally after resection of the middle turbinate.

UHTHOFF (65, **Two cases of injury of the trigeminus by a shot wound**) observed in the first case an irritability of the right eye to external influences, which always disappeared after a few days. At first the patient was suspected of producing an intentional artificial injury of his cornea. A thorough neurological examination revealed minute disturbances of the first and second branches of the trigeminus, a reduction of sensation for smell and taste on one side, and an impossibility to weep with the right eye. A roentgenograph localized a fragment of a grenade just in front of the Gasserian ganglion. While under observation disturbances appeared in the sensory part of the third branch also. In the second case there was a sharply circumscribed, isolated paresis of the second branch of the trigeminus with a disturbance of sensation, reduction of the sense of smell on one side, but not of the sense of taste, or the lacrimal secretion, or of the sensibility of the cornea.

ZADE (66, **Eye diseases in the field**) says that one peculiar disease with which the army surgeons have to contend is a hemeralopia caused by psychical change and general exhaustion.

ABELSDORFF (56, **Traumatic excitation of a gouty scleritis**)

reports the following case: A woman, 43 years old, suffering from gout, struck her left eye with her finger. Three days later a typical scleritic node appeared, which healed under the usual treatment in two weeks. He thinks that this case is confirmatory of the theory that gouty and rheumatic diseases may be excited by traumatism.

HANSELL'S (61, **Traumatic enophthalmos**) patient had a fracture of the skull involving the frontal and malar bones. He had an enophthalmos of about 10*mm*. There was diplopia, limitation of motion downwards, contraction of the field, vision $\frac{12}{18}$, but only slight pallor of the optic nerve. The condition is attributed to absorption of orbital fat and to cicatricial contraction.

ALLING.

BOOK REVIEWS.

I.—**Surgery of the Eye,** by Dr. JOHN M. WHEELER, New York, in Johnson's *Operative Therapeutics*. In Volume III., Chapter 2. Published by D. Appleton & Co., 1915.

The author has succeeded in giving in ninety well-illustrated pages a clear and practical description of the usual operations on the eye. The text to the reviewer seems perhaps too condensed, giving the impression of being the brief notes of one who is so familiar with his subject that many points are taken for granted as being known, and so are not mentioned. On the other hand, as the surgery of the eye is now so specialized, the question may well be asked: Does the general surgeon, for whom the book is designed, require information about eye operations? If so, he will probably look for a much more detailed description of certain operations, especially of the so-called urgent operations, such as for acute glaucoma or traumatic cataract, and it will be very useful for him to learn more about the indications for operating, the accidents which may occur during operation, and the post-operative complications.

A. K.

II.—**Squint: Its Causes, Pathology, and Treatment,** by CLAUD WORTH, F.R.C.S. Pp. 247. Fourth edition. London, John Bale Sons & Danielson, Ltd., 1915. Published in this country by P. Blakiston, Son & Co. Price, $2.00.

Dr. Worth's views on squint are so well known and have been so generally accepted by the profession that his teachings are the practice of most ophthalmologists. In this, the fourth edition of his book, while the main features have not been changed, the following points deserve mention. Cases of "neuropathic divergence" are cured by advancing both

internal recti. Efficient treatment of squint, if carried out from the first, will reduce the number that require operation to a very small proportion. There are still too many cases of neglected squint, and the family physician bears a large share of the blame. As to operation, the author is strongly opposed to the "combined operation," just as he is to simple tenotomies; he has kept in touch with his patients operated upon by these methods and has learned that the simple advancement operation can be accurately adjusted and that its results are permanent.

A. K.

III.—**Glaucoma:** A Symposium, edited by Drs. WILLIS O. NANCE and W. H. PECK. Chicago. Pp. 151. Published by the Chicago Medical Book Co. Chicago, 1914. Price, $1.50.

On the occasion of Colonel Elliot's visit to this country, a symposium on glaucoma was held by the Chicago Ophthalmological Society on November 17, 1913, and the invited speakers and their subjects were as follows: Dr. E. Jackson, "Etiology and Classification of Glaucoma; Dr. J. E. Weeks, "Pathology of Glaucoma"; Dr. G. E. de Schweinitz, "Concerning Non-surgical Measures for the Reduction of Increased Intraocular Tension"; Col. R. H. Elliot, "Trephining for Glaucoma"; Dr. C. A. Wood, "Operations Other than Scleral Trephining for the Relief of Glaucoma."

Each chapter was discussed by Dr. F. Lane, Dr. E. V. L. Brown, Dr. N. M. Black, Dr. F. C. Todd, and Dr. A. E. Bulson, Jr., respectively. These addresses and discussions are now printed in a small handy volume, which will be of permanent value to every ophthalmologist not only for the importance of the subject, but also for the eminence of the contributors.

A. K.

IV.—**Ophthalmoscopic Diagnosis** for General Practitioners and Students, by Dr. GEO. W. JEAN, New York. Pp. 123, 68 illustrations. Published by E. B. Meyrowitz, New York, 1915. Price, $1.00.

An excellent short guide to the use of the ophthalmoscope

and to the recognition of the various ophthalmoscopic pictures, especially suited for beginners. The text is brief and the illustrations have been carefully selected from the atlases of Haab, Adam, Frost, and the text-books of Fuchs and of Axenfeld. While the great charm of an ophthalmoscopic picture is its colors, the attempt here made to reproduce these pictures in black and white has succeeded fairly well, with a few exceptions, particularly "Commencing Choked Disk," p. 55. At the same time, to a beginner a picture in colors is of even greater help than to one who is already familiar with the condition described. A feature on which Haab and Johnson, in their atlases, both lay stress is the importance of the student making drawings himself; provisions for this and directions should in the reviewer's opinion be included.

A. K.

V.—**Lehrbuch der Augenheilkunde.** (Text-Book of Ophthalmology.) Edited by Prof. T. AXENFELD. Fourth edition. Pp. 800. Published by G. Fischer, Jena, 1915. Price, 15.50 Mk.

This text-book, written by the professors of ophthalmology in the various German universities, now appears in a new (fourth) edition. Under the painstaking editorial hand of Axenfeld this edition presents a number of distinct improvements in the shape of new illustrations, a rounding-out of the text without an increase in size. In view of the many complimentary criticisms which this book has already earned, it suffices to say that the standard is fully maintained and the text-book remains a monument to German science and bookmaking.

A. K.

VI.—**The Ophthalmic Year Book.** Vol. XI. for 1914. Edited by Dr. E. JACKSON, Denver. Pp. 545. Published by the Herrick Book and Stationery Co., Denver, Colo., 1915. Price $10.00.

We welcome the Year Book for 1914. Dr. Jackson and his able corps of assistant editors, Drs. T. B. Schneideman, W. Zentmayer, W. H. Crisp, C. A. Wood, W. Reber, H. S. Gradle, R. H. Elliot, H. W. Aufmwasser, M. Wiener, W. Walter,

F. M. Schneideman, N. M. Black, C. Zimmermann, and T. B. Holloway, have again given us an invaluable review of ophthalmic literature which must be an essential to every ophthalmologist. Though the book is somewhat larger than in preceding years, the size of the single abstract has not become too long. The amount of labor which a book of this kind entails cannot be comprehensible to one without personal experience in abstracting, and the mere arrangement of the reviews is no light task. The editor and his collaborators deserve our gratitude; and any support that we can furnish to the project by subscribing, should be unhesitatingly given.

A. K.

NOTES.

Professor E. FUCHS, one of the great teachers of Ophthalmology, has retired from the Directorship of the Second Augenklinik in the Allgemeine Krankenhaus in Vienna.

The many who have had the privilege of studying under Professor Fuchs will never forget his admirable clinics and his unusually clear, logical, and stimulating presentation of ophthalmological subjects. Though he retires from the arduous duties of teaching, he plans now to devote himself entirely to scientific studies. It is a great pleasure to state that Professor Fuchs at the age of sixty-four is enjoying the best of health, and we sincerely hope that Ophthalmology will be enriched by many additional contributions from his pen.

Professor Bernheimer, of Innsbruck, will be his successor.

OBITUARY.

The death of GEORGE COATS removes one of the most promising among the younger ophthalmologists of Great Britain. He died in Edinburgh after an operation, at the age of thirty-nine.

After graduating in Glasgow and occupying various hospital positions in that city, he went abroad to prepare himself for special work, and studied in the clinics of Vienna, Munich, Freiburg, and Zurich. He became pathologist and curator to the Royal London Ophthalmic Hospital in 1902. In 1914 he was made full surgeon to this institution, surely a great honor for so young a man.

His scientific work has been along the lines of comparative anatomy and pathology of the eye, and bears the stamp of great industry and originality, making his name well-known throughout the ophthalmological world. He is probably best known for his work on "Retinitis with Massive Exudation," (retinitis hemorrhagica externa), an unusual condition which he was the first to describe accurately and which is often spoken of as "Coats's retinitis." In one of the last numbers of these ARCHIVES he contributed two excellent papers on the subject of "Lymphomatosis of the Conjunctiva and Orbit." A career of great promise and of scientific achievement has been cut short.

We regret to announce the death of Dr. CLEMENS HARMS, of Tübingen, a victim of this war.

Dr. Harms belonged to the younger generation of German ophthalmologists. He studied under Uhthoff, Nagel, and Schleich, and his scientific contributions were along the lines of pathology, the principal ones appearing in *Graefe's Archiv* on the subject of vascular diseases of the retina and of the optic nerve.